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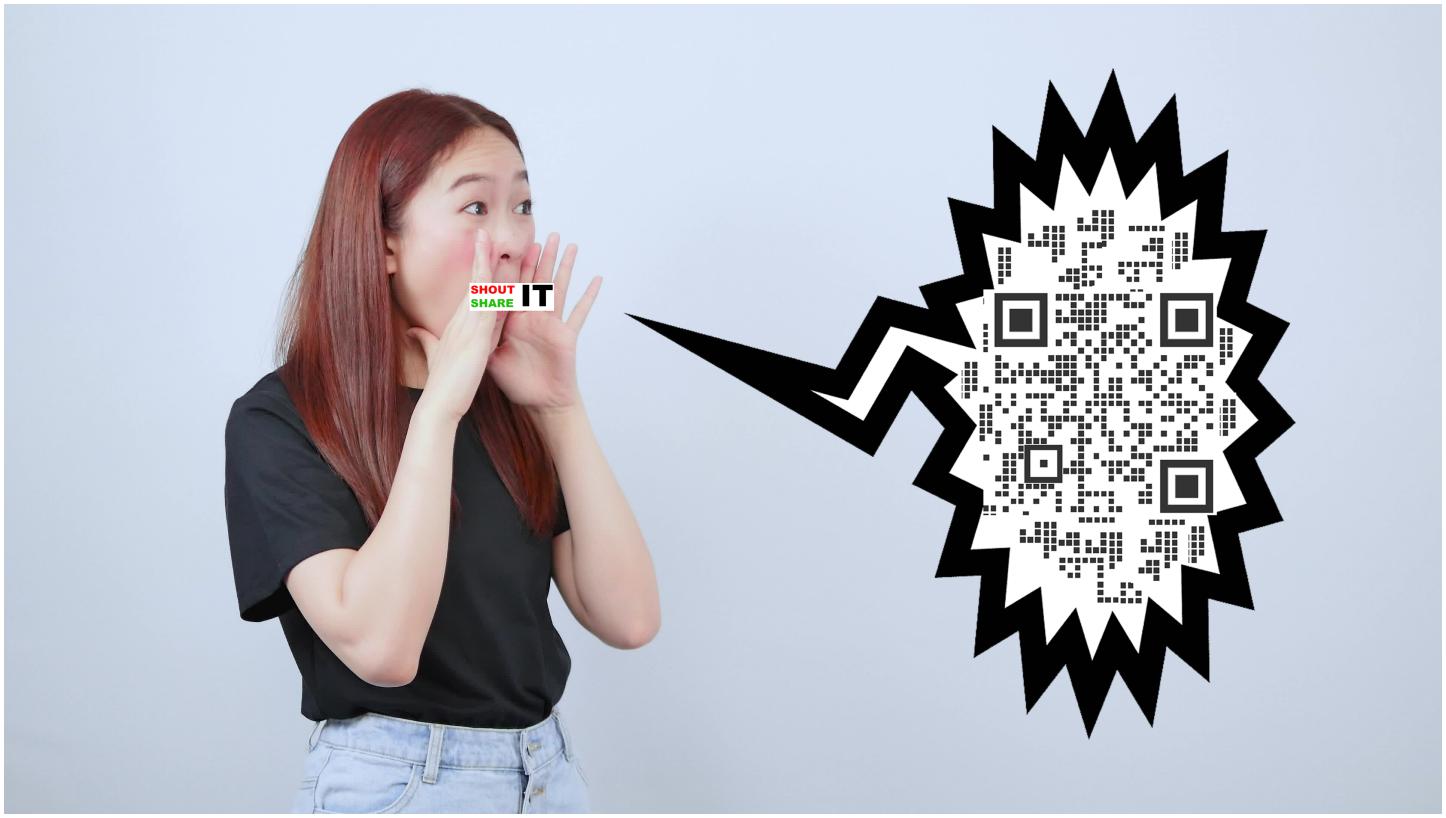
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Memoirs

AN MUSEUM, SYDNEY

MOIR IX.

NATIONAL MUSEUM
15 MAY 1947
OF VICTORIA

IMPLEMENTS
JSTRALIA

IX

1946

By
ARTHY, Dip.Anthr. (Syd.),
ssisted by
Dip.Ed., and H. V. V. NOONE.

National Museum
of
Victoria

DER OF THE TRUSTEES.
om, D.Sc., Director.
Sydney, November 15, 1946.

THE AUSTRALIAN MUSEUM, SYDNEY

NATIONAL MUSEUM
15 MAY 1947
OF VICTORIA

MEMOIR IX.

THE STONE IMPLEMENTS OF AUSTRALIA

By
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Assisted by
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PUBLISHED BY ORDER OF THE TRUSTEES.

A. B. Walkom, D.Sc., Director.

Sydney, November 15, 1946.

ADDENDA.

Merna wadna adze-flake (p. 29): An examination of the original specimens has revealed that they are not *elouera*, but a distinctive type of adze-flake of orange-quarter form, pointed at each end, and trimmed from both edges on the broad back; the inner and outer faces meet in a straight and untrimmed chord. They are elongate and thick.

Pirri Point (p. 38): Recent field-work has shown that three kinds of trimming exist among the *Pirri* of far western New South Wales and elsewhere, as follow: Firstly, a light abrupt nibbling on the butt, middle or point end of a thin edge on the lateral margin or margins, with one or two low ridges on the outer face. Secondly, a well-marked abrupt trimming on one or both lateral margins; in the latter case the outer face is frequently flat. Thirdly, the true Kimberley pressure-technique displaying narrow and more or less parallel flake-scars from the edge to median keel; the ideal *pirri* is fully trimmed in this manner and the butt is a sharp rounded edge.

A recent visit to the South Australian Museum revealed the following additional types of implements, of which a brief description is as follows:

Biface coroid implements (p. 15): A large series of flint picks, single and double-ended, from the Mount Gambier and Kongerong Range district in south-east South Australia. They are patinated and also stained a buff colour, and although trimmed pieces are similar in shape and size to the pecked *Bogan*-pick (p. 76, fig. 338).

Adze-flakes (p. 28): An adze-flake from Central Australia, which is chipped all over the outer face, and plain on the inner face. Both surfaces are convex, and the margin is trimmed all round. One example is hafted, and others are unhafted.

Club (p. 78): Stone clubs from several localities. They are flat, elongate oval, and partly trimmed implements.

Death-pointer: A polished stone death-pointer from Barrow Creek, Central Australia. It is flattened oval in transverse section, has a straight flat butt and a long finely pointed distal end, and is about 10 cm. long, 2 cm. wide, and 5 mm. thick.

THE STONE IMPLEMENTS OF AUSTRALIA.

By Frederick D. McCarthy, Dip.Anthr. (Syd.),

Assisted by Elsie Bramell, M.A., Dip.Ed., and H. V. V. Noone.

Introduction.

The study of Australian stone implements has advanced steadily during the past twenty years. At present, however, the position has been reached in which there exist a certain amount of confusion regarding typology and nomenclature and a lack of knowledge among those interested, both here and abroad, of the full range of Australian implement types and their variations. This work is a systematic study intended to clarify these aspects of the subject as far as possible; in addition, the literature on each group of implements is given, and lines are indicated along which the study of Australian stone implements can be developed. The work is not a monograph embodying all known data about Australian stone implements; it is a summary catalogue in which the sources are given where such information is to be found.

Classification.—Previous classifications are too limited in scope for modern application. Most of them are based upon collections from one locality or from restricted areas. Smyth's (1878, I, p. 358) eleven divisions are based upon function. Kenyon and Stirling (1901), and Kenyon and Mahony (1914), based their more comprehensive classifications upon methods of manufacture, function and form, but they considered function to be the most satisfactory basis were it known for all implements. Following Spencer (1899) they believed that types in any area depend largely, if not wholly, upon the kind of stone available, and upon this hypothesis they attempted to explain the variations that exist in Australian implements throughout the continent. Their classification, however, ignores not only various fracturing and abrading processes but also such factors as tradition and requirement, and the unwieldy method of reference by letters and numbers adopted by Kenyon and Stirling militated against the general acceptance of their system. It was, however, slightly modified and followed by Spencer (1901, 1914, 1922) and by Spencer and Gillen (1904, 1927). Roth's (1904) nine divisions for his Queensland material are based on function. Fürer-Haimendorff (1936) in a comparative study followed the major classification of European archaeologists, allied with established Australian terminology. McCarthy (1940–1943) employed a number of factors, embracing function, shaping processes, form, transverse-section, and aboriginal names as criteria of classification of the Australian implements as a whole.

In addition, there have appeared a number of classifications of the trimmed coroid and knapped implements in which considerable interest has been displayed in south-east Australia. Etheridge and Whitelegge (1907) adopted function, Miss Hall (1928) used form and function, and Towle (1935) adopted function, in their classifications of New South Wales material; Towle, it might be noted, divided the implements that he described into conventionalized and unconventionalized groups. Kenyon (1927) classified the geometrical microliths according to their form, which is the most satisfactory method for this group. Hale and Tindale (1930), Tindale and Maegraith (1931), and Tindale (1937) introduced aboriginal names for specialized types of implements and cultures. Howchin (1934) emphasized function, form and material as classificatory factors in his description of the implements from the Adelaide Plains, South Australia. Campbell and Noone (1943), McCarthy (1943), and Noone (1943) all adopted a similar method of classification, employing shaping processes, function and form as their criteria in detailed analyses of local collections. Cooper (1943) followed this method in his description of the large trimmed implements of South Australia.

The classification adopted in the present study conforms with the systems followed in other countries as far as is necessary. It is recognized that processes, material,

tradition, requirement, convergence, substitution, diffusion, and other considerations all play their part in the development of stone implement types and industries. Within the major groups an attempt has been made to classify the implements in the simplest and most illustrative manner, by bringing into service where required such criteria as processes, function, form, size, transverse-section, and aboriginal names to determine the different kinds or species of implements. The employment of one principle of classification, such as function, is unsatisfactory; our aim is to provide simple reference to the known range of types, and this is best accomplished by a system in which each type has a single entry and is not shown in a number of sections because it has several functions. Nor is it possible to divide the whole of the Australian implements into two major groups, prehistoric and recent, because as yet we do not know to which category many of the implements belong.

The difficulty has been encountered of defining limits to the kinds of implements because of the numerous gradations which exist among varieties. This problem can only be overcome when more comprehensive data are available for the whole of the continent or for the district in which a type or group occurs, and the same remarks apply to the question of relationships between types. We are of opinion, however, that the splitting of groups into types is a matter for very careful consideration; an excessive differentiation is not advisable and can be avoided by the adoption of a comparatively broad view of characteristics instead of a narrow interpretation of them.

It has been our aim to classify the known Australian implements in such a way that new types will fall into their correct place, otherwise new subdivisions should be created for them. In other words, the system adopted is a flexible one. This classification is essentially typological, one in which archaeological divisions or cultures are not directly involved, and they have not, therefore, been discussed. On the other hand, it is designed for the analysis of industries, cultures and mixed collections, whether from surface sites or archaeological deposits, and is suitable for both field and cabinet purposes. At the same time, by the segregation of the kinds of implements, the classification is intended to reveal or to indicate relationships and differences, the evolution and specialization of processes and forms, and local variations.

Goodwin (1935, p. 334) summarized the position in South Africa regarding classification as follows: "Briefly, Goodwin and Lowe were categorists. Acting on the advice of Haddon, they sought help from a new classification which would entail the association of groups of artefacts into cultures, then the relation of these cultures into a time-sequence (based on stratification) and finally the correlation of this with the geological background and with African and European time-sequences in general. Heese and van Hoepen led the morphological school. The former was mainly interested in technology and the variations of implement forms represented in various cultures and in different materials. The latter was keen upon classifying implements on a purely technological basis. Hewitt and Stapleton headed the same school of stratification and association within a deposit, while Hardy and Jansen each represented the localized field-worker, who makes it his business to obtain the maximum of scientific knowledge from a small regional field." The situation in Australia at the present time could be described in much the same terms. It is apparent, however, that a commonly accepted typological classification must form the basis of cultural and ethnographical classifications, and these are possible only when full archaeological and geological data are available.

It is also important that common standards be followed in descriptive work. The description of an implement should present a clear word-picture of the morphological characters, and it should be accompanied where necessary by an adequate illustration. Statistical methods of analysis may be found necessary to define specialized types in precise terms by a consideration of the range, mean, modal form and standard deviation of (*a*) the length, width, thickness and weight, and (*b*) the angles of the striking-platform of both nuclei and knapped pieces, and of the working faces; such data will also assist in determining the relationship between the material and the knapping technique.

Major Groups.—In the classification of the trimmed coroid and knapped groups in the past too much attention has been given to form and not sufficient to shaping and trimming processes. To put the matter more simply, it is better to classify an implement as a side scraper than as a rectangular-scraper, but it is still better to call it a rectangular side-scraper. Again, a scraper of oval or circular shape should be termed a discoid only when it is trimmed right round its periphery, when the term denotes both shape and use; if it is only partly trimmed then it should be called a discoidal side, side and end, or end scraper, or a semi-discoidal scraper, depending on the amount of use it displays. Thus the description of coroid and knapped implements should denote firstly the working edge and secondly the shape of specimens. There are exceptions, as, for example, nuclei which are best subdivided by striking-platforms, and the geometrical microliths for which shape is the obvious factor. The specialized and ideal types should be given an aboriginal or geographical name, and there are many implements in this category in these two important and extensive major groups.

The specialized types of trimmed coroid and knapped implements are usually end-products, or ideal types, at the head of a series of partly worked varieties. The ideal type may be considered as that displaying the greatest amount of preparation, and this, when discarded, is often worn down to a small portion or fragment of the original implement, as with the *tula* adze-flake. The *Sumatra*-type is an ideal type with which is associated a number of partly worked or semi-uniface pebble implements. The *elouera* scraper-knife and *arapia* block occupy similar positions, and the sequence is well displayed among points and microliths. In addition, attention might be drawn to a series of segments ranging from the microlithic to the larger *elouera* and *worimi* types, but their relationship, if any, is not fully understood. Specialized implements require a more than ordinary knowledge of materials and where to get them, and their manufacture frequently involves a division of labour. Thus the quarrying, quartering, rough shaping and testing of a blank is usually carried out at the workshop site, where rejects are discarded; the subsequent finishing, such as careful trimming, the grinding of a blade, pecking and polishing, may be done at leisure either in the camp of the same people or in that of a group to whom the blank is traded.

The edge-ground group is classified primarily according to function. The main subgroups are the axe-heads, adze-heads, scraper-knives and chisels. They are then subdivided by shaping process and transverse-section, characters which appear to be consistently related and important indications of cultural relationships. The classification thus provides a comprehensive picture of the range of types and techniques.

Function is again adopted for the primary sub-groups of percussion and abrading implements, and shaping processes for further subdivision. Established English names serve well for most of these implements but some specialized types, such as the *Morah* millstone and the *Kulki* percussion-muller, are given aboriginal names.

The ritual stones fall into distinctive sub-groups determined by their function or form. The name *Tjuringa* is retained for these now famous objects, while *Bogan*, *Yodda* and *Mena* types are adopted for several other specialized implements for which otherwise only lengthy phrases would have to be used. The ritual group merits a separate and detailed study both of the implements and their magico-religious significance and function.

The miscellaneous pieces are placed in a separate group because they do not fall into any other major group. While they could be further subdivided into several major groups, this course of action was not considered advisable because of the few types involved at the present time.

Nomenclature.—A matter of great importance to the development of the study of Australian stone implements is that a system of nomenclature must be established, and furthermore, it must be one by which all workers abide. In the past many authors have used new terms and names capriciously, even ignoring names in general use, for implements instead of adopting the most satisfactory one available, as a perusal of the synonymies in this work will demonstrate. Moreover, terms based on conjectured use,

such as chipped-back knife employed for points, scrapers, microliths and the *elouera* scraper-knife from the coast of New South Wales, cause much confusion. To avoid this confusion, the principle of priority in nomenclature will have to be followed in regard to Australian stone implements. In other words, if an implement is known by a well-established name there is seldom need to change it, and the latter course of action should be given the most careful consideration unless there are valid cultural reasons to merit separation.

The naming of an implement is not an easy task. Its characteristics must be defined and illustrated in order to demonstrate that the implement is a specialized type. A name stands for a set of characteristics and is preferable, where possible, to an unwieldy phrase. In this classification, we have accepted established names and terms where considered advisable, and have proposed others for general adoption. It is advisable to adopt the name given by a tribe to an implement where it is known, otherwise to use the name of a tribe in whose territory a type is first recorded or in which it is particularly abundant, or the aboriginal name of a type locality. Geographical names are suitable and are especially useful for differentiating local forms such as, for example, the Kimberley *pirri* point. An implement should be known under the one name throughout the continent, and not by different names in the various States.

It is our aim to establish an Australian terminology. We do not regard Australian implements as a group apart from all others, for in fact similarities and relationships between Australia and neighbouring regions have been shown to exist, but we wish to avoid the confusion that will arise from the use of terms which may have a different connotation in other countries. For the above reasons, a glossary of descriptive terms, as we understand them, is provided as an aid to workers and with the intention of standardizing their use in Australia.

Whether or not names already established in other countries should be adopted in Australia is a matter of some importance. We have rejected the classical terminology of palaeolithic, mesolithic and neolithic for major groups, and their subdivisions such as Abbèvillian, Acheulian, Mousterian, Aurignacian, Solutrian, Magdalenian, etc., because as yet there is no evidence in Australia to warrant their adoption. Nor is it considered advisable to extend to Australia cultural names from south-east Asia and the Malay Archipelago. Already *Kartan* has been adopted in Australia for what appears to be phase I of the Hoabinhien culture of Indo-China. We are of opinion, generaly speaking, that Australian implements and cultures should be given a local terminology, a policy which tends to promote greater care in their comparison with those of other countries.

The *Sumatra*-type (Fig. 21), however, is an exception to the above rule. The name was introduced by Stein Callenfels (1927, p. 184), as a result of his excavations of kitchen-middens in north-eastern Sumatra, where he unearthed large numbers of these implements. We have in the *Sumatra*-type in Australia a specialized type at the head of a series of partly worked varieties of uniface pebble implements, all of which are identical with those of south-east Asia and Sumatra. The term is now well established in Australian literature and is therefore retained.

Eoliths. Howchin (1921, 1933) reported surface finds of eoliths from the Tableland region of Central Australia. Campbell and Wood Jones (1925) and Tindale (1933) have demonstrated that natural forces could produce these objects. Furthermore, eoliths represent man's first efforts to convert stones into implements and weapons by the precursors of the Old Stone Age in the pre-palaeolithic age. The evidence supporting such an antiquity for the Tableland specimens, if they are implements, is inconclusive, and they are not, therefore, included in this study. The use of very crude stone implements, and also natural sharp-edged stones, during modern times by the aborigines has been recorded by Tindale (1941), Mountford (1941), and Love (1943), but they cannot be classified as eoliths. The natives throughout the continent apparently used suitable lumps, pebbles and nodules for many purposes and such implements can only be classified according to their function.

Distributions.—The distributions of the various kinds of stone implements in Australia are so imperfectly known that no attempt is made in this work to give them

precisely; where an implement is more or less universally found its distribution is not mentioned, but where a type is restricted in occurrence the approximate distribution is given. Somewhat similar remarks apply to the dimensions given for various types.

Material and technique.—Holmes (1919, p. 279) stated that "the processes employed in a given case were determined by the nature and form of the material worked, by the available shaping tools, by the intelligence and skill of the workman, by the character of the object or work designed, and by a number of minor considerations". Most siliceous stones are suitable for making stone implements, and in many parts of Australia material of good knapping quality is available, while in other parts the absence of such materials compelled recourse to inferior grades of stone, or to trade, to obtain them. Materials vary in fracture, texture and hardness, and their identity should always be stated in descriptions of implements. In Australia the hypothesis that material controls the form of knapped and of coroid implements has been widely supported since it was first expounded by Spencer (1899). Comprehensive data are not yet available in Australia on knapping techniques and shaping processes, nor is it known to what extent the natives were able to adapt or to employ their techniques skilfully enough to control material. Goodwin (1933) admitted that throughout South Africa there is a continual reversion to material and that various developments were forced by the need for adapting techniques to it. The following references on this matter in Australia should be consulted:

1872. Evans, p. 23.
1891. Axe-techniques, Etheridge, p. 375.
1901. Material and technique, Spencer, pp. 78-79.
1899. Material and technique, Spencer and Gillen, p. 591.
1903. Pressure-trimming, Clement, pp. 4-5.
1904. Flaking, Roth, sects. 22-24, figs. 23-29; chipping, Spencer and Gillen, p. 654.
1914. Material and technique, Kenyon and Mahony, pp. 3-4, 6-7, 10, 13; Spencer, *B*, p. 353; Spencer, *B*, pp. 76-77.
1921. Knapping, Howchin, pp. 280-1.
1925. Chipping and flaking, Basedow, *B*, pp. 359-70; Spencer, pp. 31-32.
1926. Material and technique, pygmy implements, Kenyon, Mahony and Mann, p. 466.
1927. Chipping on one face, Kenyon, p. 283; material and technique, Spencer & Gillen, Vol. II, pp. 536-8.
1928. Material and axe-forms, Thorpe, p. 246; Thorpe and Stanley, p. 210.
1929. Evolution of stone tools from simple flake, Aiston, p. 130.
1930. Material, technique and form, Towle, pp. 4-14.
1931. Flaking and chipping, Thorpe, *C*, pp. 19-20; chipped-back and pressure techniques, Turner, *B*, p. 33.
1934. Material, technique and form, Anonymous, pp. 170-1, 191.
1934. Dripping-gum technique, Turner, *A*, p. 228.
1935. Pressure-flaking, Davidson, pp. 170-80, fig. 22.
Material, technique and form, Towle, pp. 117-43, pls.
1936. Fürer-Haimendorff, pp. 9, 17-18, 20, 25.
1940. Technique, material and form, McCarthy, *B*, pp. 244-5.
1941. Knapping technique, McCarthy, *B*, p. 263; Tindale and Noone, pp. 116-22, figs. 1-3.
1943. Percussion and pressure techniques, Campbell and Noone, *A*, pp. 282-3; Noone, *A*, pp. 271-2, 278, 280.
Point techniques, Campbell and Noone, *A*, pp. 283, 289-91; *B*, pp. 375-7, 384-6; McCarthy, *A*, pp. 129-30, *C*, pp. 199-201; McCarthy and Davidson, pp. 210-1; Mitchell, pp. 59-62; Noone, pp. 136-9.

Bibliography.—The bibliography includes principally those papers which deal primarily with the typology, antiquity and relationships of stone implements, but other references vital to the work are included. The innumerable scattered references to stone implements in the general literature on the aborigines of Australia are not included, and their analysis is a task too immense to undertake at the present time; this literature contains a mass of valuable data, and should be consulted in all localized studies. The papers and works included in this bibliography have been analysed and indexed in order to provide a separate synonymy and bibliography of each specialized type or group of implements; this method reveals not only the extent of the work done on the implements but also the progressive changes in their nomenclature, and it will serve as a basis for future research. Mahony (1943) has recently published a detailed bibliography of litera-

ture relating to the antiquity of man in Australia. The following references deal with industries and cultures differentiated to date in Australia:

1878. Neolithic, Smyth, Vol. I, p. 360.
1904. Palaeolithic and neolithic, Spencer and Gillen, p. 635.
1914. Australian and Tasmanian relationships, Palaeolithic and Neolithic, Kenyon and Mahony, p. 13.
1922. Implement areas, Horne, p. 63.
Australian and Tasmanian relationships, Spencer, p. 74.
1927. Indigenous origin, Kenyon, p. 285.
Eolithic, Palaeolithic and Neolithic, Spencer and Gillen, Vol. II, pp. 536-7, figs. 182-85.
1928. Palaeolithic and Neolithic, Spencer and Gillen, Vol. II, p. 506.
1930. Murundian, Mudukian, Pirrian and Tartangan cultures, Hale and Tindale, pp. 203-8.
1931-32. Tasmanoids, Thorpe, p. 78, figs. 1-6.
1933. Epi-palaeolithic or mesolithic, Ward and others, p. 1272.
1934. Australian and Tasmanian relationships, Anonymous, p. 170.
Antiquity, Howchin, pp. 86-91.
1935. Scraper and adze industries, Davidson, pp. 159-67.
Australian and Tasmanian relationships, Davidson, p. 166.
Devon Down's cultures and materials, Tindale, p. 264.
Coastal and inland implements, Towle, pp. 124-5.
1936. Palaeolithic and Neolithic, etc., Fürer-Haimendorff.
1937. Fulham, Kangaroo Id., Tasmanian, Upper Palaeolithic of Malaya, Tartanga, Murundian and Pirrian, Tindale, pp. 55-60.
1938. Microlithic, Hoabinhien, Flake, Point, Mt. Gambier, Neolithic, Bronze, Devon Downs and Tartangan cultures, McCarthy, pp. 39-40; and 1940A, pp. 30-50, pls. i-xi.
1940. Microlithic and Proto-Neolithic axe cultures, Casey, pp. 28-29.
Hoabinhien, McCarthy, *C*, p. 224, and *B*, p. 262.
Diffusion of types and techniques, McCarthy, *B*, pp. 249, 261-2; 268, 294, 304, 306, fig. 3, pl. Z.
Areas of local variation, McCarthy, *B*, pp. 251-7, fig. 3.
Elouera and *Tula* industries, McCarthy, *B*, p. 251.
1941. Hoabinhien culture, McCarthy, *B*, pp. 259-60, figs. 1-12; *C*, p. 260; *F*, p. 25.
Microlithic, Mt. Gambier, *Elouera*, *Tula-Pirri*, and Kimberley spearpoint industries, McCarthy, *B*, pp. 257-62.
Australian and Tasmanian relationships, McCarthy, *B*, pp. 262-3.
Tartangan, Gambieran, Kartan, Fulham, Pirrian, Mudukian and Murundian cultures, Tindale, *A*, pp. 144-7.
1943. Pirri, Abrupt-trimmed bladelet, Microlithic and Adze-flake industries, Noone, *A*, pp. 275-6, 280.
Microlithic, Campbell and Noone, *A*, pp. 303-4.
Woakwine industry, Antiquity and Tasmanian relationships, Campbell and Noone, *B*, pp. 384-5.
Kangaroo Id. Pebble Industry, Cooper, *A*, p. 347.
Hoabinhien culture and *Elouera* industry, McCarthy, *A*, pp. 150-2.
Australian and Tasmanian relationships, McCarthy, *A*, p. 143.
Elouera industry and *Bondi* microlithic culture, McCarthy and Davidson, pp. 227-30.
Faceted-butt technique, McCarthy, *A*, pp. 129-30, *C*, pp. 199-200; McCarthy and Davidson, pp. 210-1.
1944. Indigenous types and techniques, Noone, pp. 136-9.

Grinding and Pecking Processes.—Additional references to the application of these processes are given in the major groups of edge-ground, percussion and abrading, and ritual implements:

1935. Edge-grinding, McCarthy, p. 264.
1936. Edge-grinding, Fürer-Haimendorff, pp. 23-25, 27, 439.
1938. Edge-grinding and pecking, McCarthy, *A*, pp. 39-40.
1939. Pecking and polishing, McCarthy, *A*, pp. 6-8.
1940. Edge-grinding, pecking, and polishing, McCarthy, *A*, pp. 34, 40-43, 47; *C*, pp. 224-7, figs. 2-3, pls. vii-ix; *B*, pp. 249, 268.
1941. Pecking, McCarthy, *B*, p. 332; *C*, p. 372.
1943. Edge-grinding, McCarthy, *A*, p. 151; Noone, *A*, p. 280.

Suggested lines of research.—Another purpose of this work is to provide a common basis for future studies on the stone implements. A great deal of analytical and descriptive work has yet to be done on collections from local areas and sites, and on specialized types. Scanty information is available about fracturing and shaping processes because quarries and workshops are as yet inadequately studied. The distinctions between implements proper, blanks, and reject material are not clearly understood. It

is essential that such detailed work be carried out on a wide scale before it will be possible to plot accurately the distributions of types, processes, industries and cultures, or to understand the causes of local variations and other problems. Above all, excavations on scientific lines must be carried out throughout the continent before we can hope to elucidate the history of our stone implements. In this regard, the attention of the over-zealous amateur investigator should be drawn to the fact that invaluable evidence will be destroyed if deposits are dug out merely for the sake of collecting implements, as Haddon (1905) said in regard to South Africa, "A few hours' of careless excavation may destroy more archaeological evidence than centuries of neglect . . . it cannot be too strongly insisted upon that the methods of the archaeologist should be those of the geologist. Accurate mapping of deposits or localizations of finds is absolutely necessary . . . sequence and technique must not be confounded, and our first business should be to establish the former on a sound basis . . . this can only be accomplished by adhering rigidly to the stratigraphical methods of the geologist . . ." Much valuable information can still be obtained from the living aborigines in remote areas, a point well exemplified by the films of the Board of Anthropological Research of the University of Adelaide.

General Remarks.—Attention is drawn to the necessity for systematic collecting. Since unlabelled material is practically valueless for scientific purposes it is essential that the locality be marked on all specimens, and the data recorded concerning their situation when collected. The pooling by donation of collections in the museums makes possible more effective research and prevents the loss of unique specimens to the nation. These institutions provide facilities for those wishing to pursue serious study of the material thus centralized. It might also be pointed out that the State museums in Australia are often hampered in research work by the lack of adequate comparative material from other States; these deficiencies can be remedied to a large extent by amateur collectors who visit or live in remote parts of the continent. Then there is the very fine example to collectors set by the late Dr. H. O. Lethbridge by his establishment of a museum at Narrandera, a country town in New South Wales, in which the stone implements of the district are the principal feature; such museums could be established in many other localities.

It should be noted that implements of iron, glass or other European materials are not included in this work. The hafting methods employed in Australia for stone implements are not discussed in detail, but they are shown in Figures 324–330.

Acknowledgements.—This work was commenced in 1936 at the suggestion of Professor J. L. Shellshear, M.B., Ch.M. Detailed work was then carried out, with the assistance of Miss Elsie Bramell, M.A., Dip.Educ., on the collections of the Australian Museum, as a result of which a preliminary manuscript was drafted. This manuscript was discussed with Mr. D. A. Casey, of Melbourne, and Mr. N. B. Tindale, Ethnologist, South Australian Museum, with various delegates at the Congress of Prehistorians of the Far East held in Singapore in 1938, all of whom stressed the need for such a work, and some of whom, especially the late Dr. P. V. van Stein Callenfels, made valuable suggestions in regard to classification. The work was then held up until 1943, but during the intervening period the bibliographical section was advanced. The classification was then re-cast with the valued assistance of Mr. H. V. V. Noone, and the manuscript submitted to various people for comment with the aim of settling any important differences of opinion prior to its publication. Many valuable suggestions were received from those who read the manuscript, comprising the late Mr. D. J. Mahony, M.Sc., Director of the National Museum of Victoria, Dr. L. Adam, Research-worker in Anthropology at the University of Melbourne, Professor J. L. Shellshear, M.B., Ch.M., Department of Anatomy, University of Sydney, and Dr. T. D. Campbell, a member of the Board of Anthropological Research of the University of Adelaide. The classification and glossary of definitions were submitted to Dr. C. van Riet Lowe, Director of the Archaeological Survey of South Africa, and many of his suggestions are included in the glossary. The classification of nuclei is based largely upon a communication from Professor S. E. Barnes, of Kent.

England. I have also to thank Miss Nancy Adams for the splendid series of line-drawings, and Mr. G. C. Clutton for the photographs.

CLASSIFICATION

TRIMMED COROID OR CORE IMPLEMENTS

Nuclei 9
- *Simple platforms*
  - Specialized type: *Horschoof*
- *Alternate platforms*
- *Indiscriminate platforms*
- *Compound platforms*

Utilized nuclei 12

Uniface coroids 13
- *General*
  - Pebble
  - Semi-uniface
  - Uniface or Sumatra-type

Biface coroids 15
- *Semi-biface* and *biface*
- Specialized type
  - *Kodja*

Nucleiform burins 17

KNAPPED IMPLEMENTS

Blocks 17
- *Crowned, carinate* and *burinate*
- Specialized types
  - *Karta*
  - *Arapia*

Slices 21
- *Scraping* and *cutting* types
- Specialized types
  - *Split-pebble*
  - *Worimi cleaver*

Normal flakes and blades 22
- *Scrapers*
- *Knives*
  - *Plain* and *serrated* edges
  - Specialized types
    - *Surgical*
    - *Duelling*
- *Scraper-knife*
  - *Eloucra*
    - *a.* Butt and distal ends untrimmed
    - *b.* Butt untrimmed
    - *c.* Whole of thick margin trimmed
  - *Utilized*
- *Adze-flakes*
  - General
  - Specialized types
    - *Merna-wadna*
    - *Burren-Slug*
    - *Tula*
    - *Adelaide-type*
- *Leilira-blade*
  - Men's knife, women's knife, pick-axe, and spear-point
- *Piercers*
  - General
  - Specialized type
    - *Hafted drill*
- *Burins*
  - Spalled, scaled and utilized.
- *Fabricators and trimming-stones*
  - General
  - Punch-type
- *Use-polished edge*
- *Points*
  - *Asymmetrical*
    - General
    - Specialized types
      - *Bondi*
      - *Woakwine*
  - *Symmetrical uniface*
    - General
    - Specialized types
      - *Pirri*
      - *Adelaide*
      - *Bi-marginal*
      - *Paroo*
  - *Symmetrical biface*
    - Specialized types
      - *Kimberley*
      - *Wanji*
      - *Kimberley serrated edged*
  - *Untrimmed*

Microliths 39
- General
  - Microliths of types represented in the trimmed coroid and other knapped sub-groups follow the classification of those groups.
- *Geometrical*
  - *Rounded*
  - *Angular*
    - Triangles and trapezes
  - *Stigmate or micro-burin*
  - *Untrimmed*
    - Spear barbs and saw-knife (*Taap*) teeth

EDGE-GROUND IMPLEMENTS

Axe-heads 45
- *Uniface pebble or Windang type*
  - Semi-uniface and uniface
- *Pebble*
  - Plain and semi-biface
- *Uniface blade*
- *Biface coroid*
  - Rounded and lenticular sections
  - Tanged or shouldered type
- *Pecked*
  - Rounded, lenticular and rectangular sections
  - Tanged or shouldered type
- *Pecked and grooved*
  - Marginal grooves (waisted or necked) of rounded, lenticular and rectangular sections
  - Encircling grooves of rounded, lenticular and rectangular sections
  - Encircling, median and diagonal grooves (*Wanalta*-type)
  - Encircling groove and mortar depression (*Pur-rut-thri*-type)
- *Fully ground or polished*
  - Rounded and lenticular sections
- *Fully ground or polished and grooved*
  - Marginal grooves of rounded and lenticular sections.
  - Encircling grooves of rounded and lenticular sections.

Adze-heads 53
Trimmed biface coroid
Rounded and lenticular sections
Pecked
Rounded, lenticular, rectangular and hog-back sections
Pecked and grooved
Marginal grooves of rounded and lenticular sections
Encircling grooves of rounded and lenticular sections
Fully ground or polished
Rounded, lenticular and hog-back sections
Fully ground or polished and grooved
Marginal grooves of rounded and lenticular sections.
Encircling grooves of rounded sections
Adze-like
Scraper-knives 54
Knapped flake or blade
Pebble
Trimmed biface coroid
Pecked
Fully ground or polished
Specialized types
Bulga
Reniform
Chisels 54
Knapped flake or blade
Pebble
Trimmed biface coroid
Pecked
Fully ground or polished
Alien forms of edge-ground implements
PERCUSSION AND ABRADING IMPLEMENTS
Percussion 57
Detaching stones, fabricators and trimming-stones
Trimmed coroid, utilized nuclei, knapped pebble, or pecked types, with or without marginal or encircling grooves.
Specialized types
Kulki
Brachina
Oyster-picks
General
Specialized type: *Riambi*
Anvils
Trimmed coroid, utilized nuclei, knapped, pebble or pecked types
Abrading 61
Millstones
Pebble or trimmed slab
Pecked
Specialized type: *Morah*
Mullers
Pebble or trimmed lump
Pecked
Whetstones
Pebble or trimmed lump
Pecked
Bone-polishers
Pebble or trimmed lump
Pecked
Smoothing stones
Pebble or trimmed lump
Pecked
Fish-hook files
Combined percussion and abrading .. 65
Mortars
Pebble or trimmed lump
Pecked
Percussion-mullers
Rock engraving tool
RITUAL IMPLEMENTS
Cylindro-conical 66
Cylindrical, conical, phacoid and cornute types
Tjuringa 68
Sundry engraved 70
Naturalistic and/or geometric designs
Muraian 71
Sundry painted: Naturalistic and/or geometric designs 71
Phallic 71
Male circumcision, and circumcision-subincision types
Female
Natural stones
Magical 74
Mineral crystals
Pebbles and lumps
Sundry
Legendary 74
MISCELLANEOUS IMPLEMENTS
Hunting and domestic 75
Basket-weights
Fire-making stones
Sinkers and fishing-stones
Picks
Plain or *Bogan*-type
Grooved or conical type
Tanged
Yodda
Mena
Weapons 78
Clubs
Missiles
Playthings and ornaments 78
Balls
Natural or shaped pebbles or lumps
Clay or mud
Septum-pin
Tops
Perforated stones 79

TRIMMED COROID OR CORE IMPLEMENTS.

NUCLEI. (Figs. 1-9, 30, 35, 240.)

Referred to as nuclei or cores, unless otherwise stated, in the list of references.

1901. Kenyon and Stirling, p. 193 and table; Spencer, p. 80.
1904. Roth, sect. 22, figs. 30-6.
1907. Etheridge and Whitelegge, pp. 237, 249 (gouges), pl. xliv. group 4.
1914. Kenyon and Mahony, p. 7.

1925. Basedow, *B*, p. 364.
1927. Doak and Doyle, p. 33; Kenyon, p. 285.
1928. Hall, p. 260.
1929. Aiston, p. 123.
1932. Thorpe, p. 79.
1933. Upper Coliban core, Mahony and others, p. 1340.
1934. Howchin, pp. 25-28, figs. 2-7; Kennedy, *E*, pp. 200-1; McCarthy, pp. 240-1.
1937. Tindale, p. 54.
1941. McCarthy, *B*, pp. 260-1; *F*, pp. 21, 23, pl. vi, figs. 1, 7-8.
1943. Campbell and Noone, *A*, p. 302, figs. 75, 109-12; *B*, p. 383, figs. 148-55; McCarthy, *A*, pp. 131, 133-6, figs. 1-7; *B*, p. 164, pl. xii, fig. 1; *C*, pp. 201-2, figs. 2, 4; McCarthy and Davidson, pp. 211-2, figs. 12, 71-73; Noone, *A*, p. 277, fig. 21; Noone in McCarthy, *C*, pp. 199-200, fig. 3 (secondary nuclei); Towle, p. 73, pl. vi, fig. 1.

The most convenient basis for the classification of nuclei or cores is according to the nature and number of striking platforms. The following kinds are recorded in Australia:

Simple Platform.—This kind of platform is usually made by removing a flake by a single blow to produce a concave or a flat surface. The platform may be at right angles to the core-axis (Figs. 1, 30) or inclined at an angle (Fig. 3) of varying steepness, but usually at about 75°. In both varieties there may be a platform on each end (Figs. 3, 4), on two opposite or adjoining sides, or on one end and one side. The presence of three platforms (Fig. 5) more or less determines the shape of a nucleus, and where there are four platforms the nucleus is often cubical in form. The edge of a flake-scar may serve as a second or third platform.

The simple platform of the faceted kind (Fig. 6) bears a series of small flake-scars due to the removal of scales inwards from its edge (not to be confused with those running down the flaking face) for the purpose of providing a seat for a punch and to prevent the latter slipping when struck. Flakes (Fig. 11) struck from such cores bear a faceted striking platform, and have been recorded from several localities in New South Wales.

Prismatic nuclei with a simple platform may have a flat, pointed or chisel-like end.

Horsehoof (Figs. 31–32).—Referred to as *Horsehoof* core implement unless otherwise stated in the list of references.

1921. Core-scrapers, horsehoof variety, Horne, *A*, p. 15, fig. 100.
1931. Trimmed core-like implement, Tindale and Maegraith, pp. 281, 288, figs. 8*a-c*.
1936. Hoekkratzer, Fürer Haimendorff, pp. 12-13, fig. 6.
1937. Tindale, pp. 19-56.
1940. McCarthy, *A*, pp. 32, 36, pl. ii, figs. 3-6; High-crowned cores, McCarthy, *B*, p. 262.
1941. Tea-cosy cores, McCarthy, *B*, p. 261, fig. 5; *F*, p. 24.
1943. Campbell and Noone, *B*, p. 384; Cooper, pp. 343-69, figs. 1-27, 83, 88-90, 93-4; McCarthy, *C*, p. 202; McCarthy and Davidson, p. 212, fig. 12; Mitchell, p. 61; Noone, *A*, p. 277, fig. 22.
1944. Noone, p. 138.

The *horsehoof* nucleus is of domed or conical form. Its base is flat or slightly concave, and from round to oval in shape. The trimmed margins are usually rounded, although some portions are straight, and often bear concaves or noses. Another feature of the edge is that it is often worked back by stepped trimming from an outward to an inward angle to such an extent that the body of the implement overhangs the working edge. *Horsehoof* nuclei were probably discarded when they had reached this stage. Some

Figures 1-11.

1-2. Prismatic nuclei with simple platform. Chert. Singleton, N. S. Wales. 3. Prismatic nucleus with simple platform at each end. Chert. Singleton, N. S. Wales. 4. Nucleus with simple platform. Chert. Singleton, N. S. Wales. 5. Nucleus with one simple platform and two other platforms formed at the ends of the flake-scars. Chert. Singleton, N. S. Wales. 6. Nucleus with faceted simple platform. Chert. Singleton, N. S. Wales. 7. Pebble nucleus showing the beginning of alternate knapping. Flint. Kongorong Hills, South Australia. 8. Nucleus with compound platform; lower surface and lateral views. Fine-grained quartzite. Lake Narran, N. S. Wales. 9. Pebble nucleus showing radial flake-scars resulting from alternate knapping. Quartzite. Bellambi, N. S. Wales. 10. Flake with plain striking-platform. 11. Flake with faceted striking platform.

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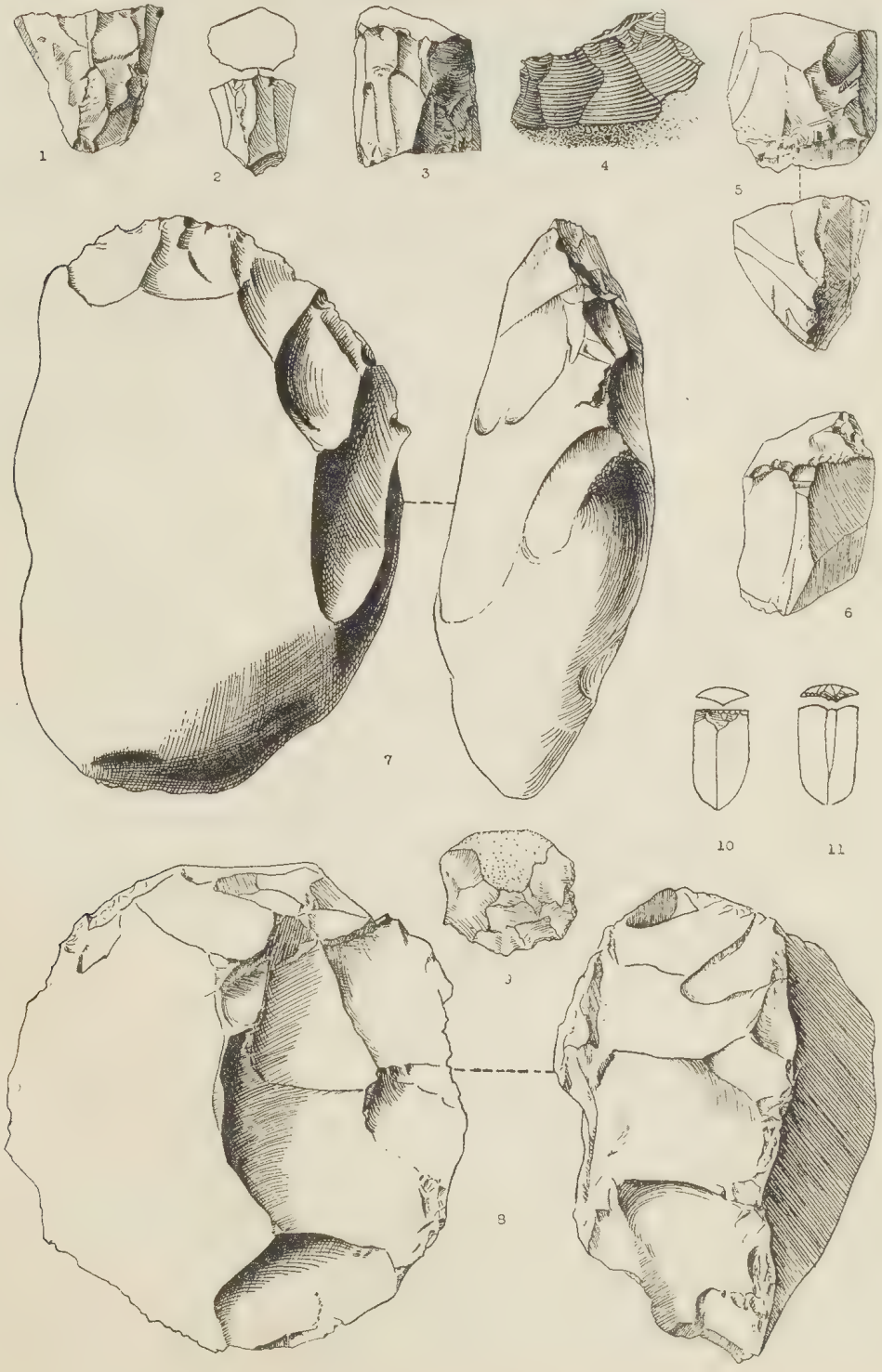
examples bear an additional cleavage face either at right angles to the base or at an oblique angle across one side. Large flake-scars extend from the working edge to the crown of the implement, and from the additional platform if it is present. *Horse-hoof* nuclei range up to more than 15 cm. in both thickness, and length or diameter, and the large examples are very heavy implements. They are widely distributed through-



Figures 1-11. Nuclei.

out the inland parts of the continent, and occur occasionally on coastal sites. The name was proposed by Tindale (1937, pp. 49-56).

Cooper (1943, p. 348) removed a bark-shield of oval shape, 73 cm. long, from a tree (*Eucalyptus leucoxylon*), within a period of ten minutes by means of a *horsehoof* block about 58 oz. in weight. He is of the opinion that many of these implements, because of their great size and weight, required both hands for their manipulation.

Alternate Platforms. This kind of platform is characterized by radial or convergent knapping. It originates when the flake-scar of a flake struck from the upper surface of a nodule serves as a platform from which to strike a second flake from the under side of the nodule. This second flake-scar in turn serves as a platform for striking a third flake. This alternate knapping process is repeated along the edge of a nucleus, but a series of two or more flakes may be struck consecutively from one surface followed by a similar series from the other surface. This method of knapping produces semi-discoidal (Figs. 7, 9) and discoidal nuclei; these are incorrectly called choppers because the cortex is left as a hand-grip on the body of the nucleus, which is a flattish nodule or pebble of varying shape. When the knapping is continued right round the periphery on both surfaces of a nodule the alternate technique produces a bi-conical core which may have a narrow strip or section of cortex on one or both surfaces (Fig. 9).

Indiscriminate Platforms. -Cores with indiscriminate platforms are usually irregular in shape, and become globular when all possible flakes have been removed. The knapping technique appears to be a modification of the alternate-platform method. The flakes are knapped from any convenient flake-scar or flattish portion of cortex, and several flakes may be struck from the same platform.

Compound Platforms.—This kind of platform is prepared by knapping a series of contiguous flakes around the periphery of the platform; it is usually round or oval in shape, and is formed by the numerous flake-scars which extend completely round the platform or occur in isolated groups of two or three (Fig. 8). The function of the compound platform is to enable flakes to be knapped from any point on the periphery of a nucleus; the flake-scars which shape and form the flaking-face also form the outer face of a flake knapped from a nucleus by a single blow.[1]

In the cortical variety the flake-scars forming the platform are comparatively small and short, and leave an area of cortex in the centre of the underside of the nucleus. These flake-scars may be found either all round the periphery or segregated in groups along the ends or lateral margins of the flaking face. Their function is to form platforms from which flake implements of the desired form may be shaped on the flaking face from which they are subsequently detached.

Secondary nuclei (Fig. 35) (Noone, 1943, *B*, pp. 199-200, fig. 3) display the utilization of knapped blocks and suitable flakes in the production of symmetrical flakes and blades.

Nuclei range from those of microlithic size (Fig. 240) to those with a flaking face 24 cm. or more in height, and 70 lb. or more in weight.

Utilized Nuclei.

1921. Core scrapers, knives, points, Horne, p. 15, figs. 98-9.
1924. Choppee, Horne and Aiston, p. 99.
1941. Pebble core implements, McCarthy, *F*, pp. 21, 23, pl. vi, fig. 8.
1943. Cores used as implements, biface discoids, McCarthy, *A*, pp. 131, 135, 151, fig. 7; *C*, pp. 201-3, fig. 20; McCarthy and Davidson, pp. 211-3, fig. 77.
Nucleiform percuteurs and punches, Campbell and Noone, 1943, *B*, p. 383, figs. 141-7, 156.

These nuclei have a working edge prepared by trimming or developed by use as choppers, scrapers or cutters. This edge is either straight, semi-discoidal, or discoidal, or it may be serrated or concave; in addition, the implement may bear a nosed or burinate working edge. The form of utilized nuclei includes crowned, keeled and irregular kinds.

[1] One type of compound-platform nucleus is known as the tortoise-core. Both surfaces are knapped and more or less conical. The flake-scars forming the platform are large and wide and meet at a point which is usually slightly to one side of the centre; they are knapped all round the periphery. The tortoise-core has not been recorded from Australia.

There may be evidence of percussive work on the edges. The nucleiform fabricators, detaching and trimming stones are classified with the percussion group.

Uniface Coroid Implements.

It has not been possible to separate the references to this group, apart from the uniface pebble implements, from that of the biface coroids, and they may be seen under the latter heading.

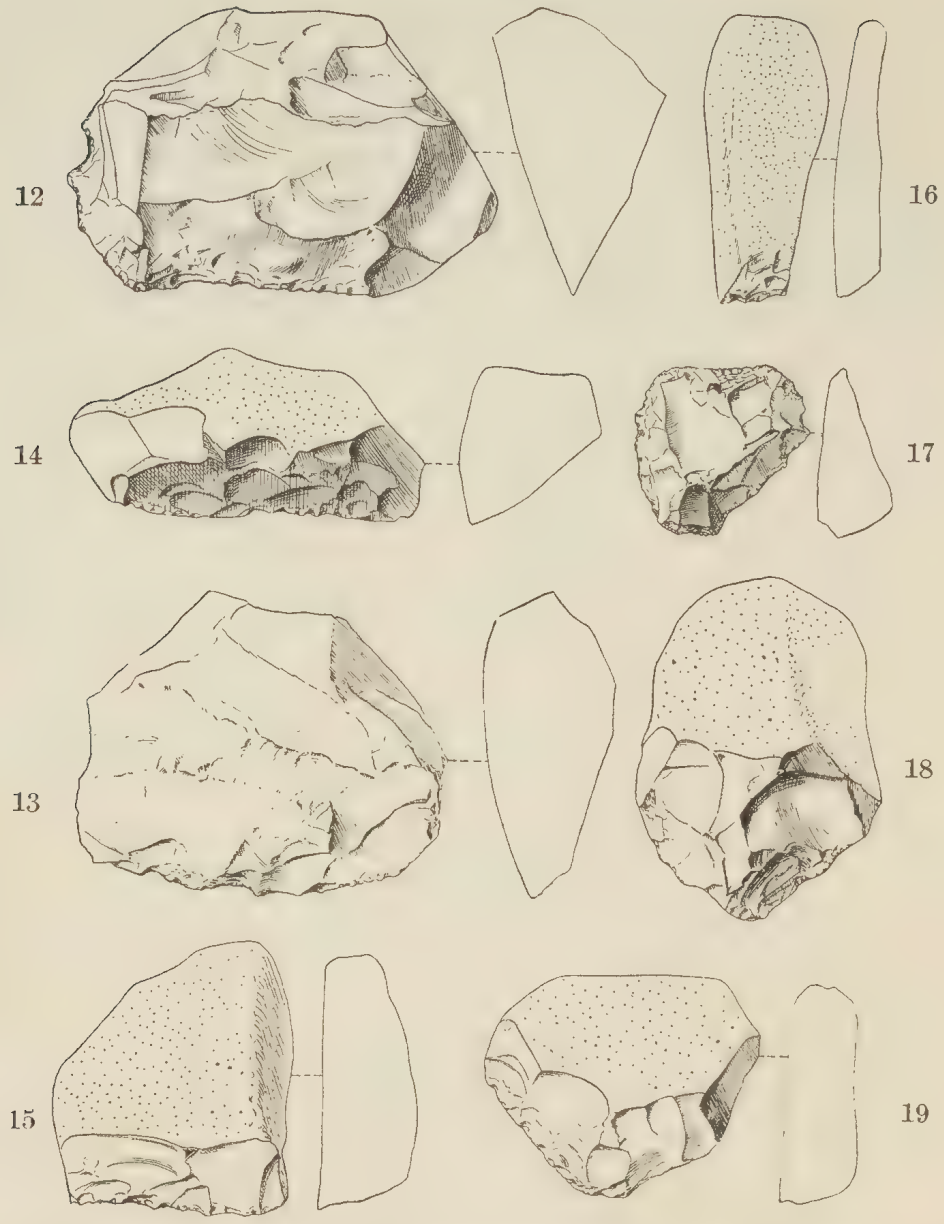
Generally speaking, the uniface coroid implements are irregular pebbles, nodules or lumps of stone trimmed or untrimmed all round the margin, and the lower surface is usually of cortex. They are widespread in occurrence. Tindale named the Kangaroo Island examples as *Karta* (Fig. 37), a name given to the island by the Raminjeri tribe of the mainland.

Uniface pebble implements. (Figs. 14-22.)

1885. Half-formed implements, MacPherson, p. 115.
1895. Half-finished implements, Helms, pp. 403-4, pl. xxix, figs. 1-3.
1901. Flaked or chipped edge axes, a, Chipped edge, 1, one side, Kenyon and Stirling, p. 193 and table, pl. xxv, figs. 1-2. Spencer, pp. 79-80.
1907. Scrapers, Etheridge and Whitelegge, p. 249.
1914. Choppers or axes, Kenyon and Mahony, pp. 5, 11.
1915. Pebbles chipped from one side, Breton, p. 25.
1921. Pebble-axes, core-scrapers or grattoirs, Horne, *A*, pp. 10-1, 15, figs. 38-42, 93-95; Pebble implements, Horne, *B*, p. 49; Pebble hand-axes or choppers, Pulleine, p. 279.
1922. Axes, pebbles chipped on one side, Spencer, pp. 74, 86.
1924. Pebble axe, Horne and Aiston, p. 99.
1927. Bouchers or axes, Doak and Doyle, pp. 34, 38; Pebble choppers, Kenyon, pp. 284-5.
1928. Improvised pebble-axes, Thorpe and Stanley, p. 210.
1931. Axes or choppers flaked on one end or side, Mitchell, p. 162; Pebble choppers and flaked pebble axes, Rolfe, p. 37; Pebble axes, improvised axes, pebble choppers, Thorpe, *B* pp. 92-95, pls. ix-x; Trimmed core-like implement of elongate-oval type, Tindale and Maegraith, pp. 281-2, 288, figs. 9*a-c*.
1932. Improvised pebble axes, Thorpe, *B*, p. 307, pl. xxvii, figs. 2, 4; xxx, 2; xxxi, 6.
1933-34. Crude hand-choppers, Hale and Tindale, p. 131, fig. 169.
1934. Choppers or axes, Anonymous, p. 170; Sundries (5), a unique implement, Howchin, p. 85; Split and worked pebbles, Kennedy, E., *A*, pp. 200-1; Split-pebble implements, Kennedy, E., *B*, pp. 229-31; Flaked pebble axe, McCarthy, pp. 240-1.
1936. Diskusförmige Geräte Gerällbeile, *Sumatra* hand-axt, Kiesel gespaltene, Kurzaxt, Furer-Haimendorff, pp. 12-16, 20, 23, 433-9, 444, 449, fig. 8.
1937. *Sumatra* implements, Tindale, pp. 39-60, figs. 6-8, 10.
1938. Uniface pebble implements, McCarthy, p. 39.
1939. Pebble choppers, Croll, p. 13, fig. 1; *Sumatra* implements, Jackson, pp. 290-3, figs. 1-3.
1940. Uniface pebble implements, McCarthy, *A*, pp. 30-35, 41, 46-47; *B*, p. 262.
1941. *Sumatra*-type hand-choppers, Cooper, p. 3; *Sumatra*-type, McCarthy, *A*, pp. 223-4, figure; *B*, pp. 259-60; Uniface pebble implements, McCarthy, *F*, pp. 21-25, pl. vi, figs. 3-6; *Sumatra*-type, Tindale, *A*, p. 145; *B*, p. 41.
1943. Uniface pebble implements, Campbell and Noone, *B*, p. 384; Semi-uniface pebble chopper, Cooper, *A*, pp. 343-69, figs. 37-79, 91-2, 95-6; Uniface pebble implements, McCarthy, *A*, pp. 131, 136-7, figs. 8*a-c*, 9; *B*, pp. 165-6, fig. 5; *C*, pp. 202-3; McCarthy and Davidson, pp. 211, 214, figs. 2-7.
1944. Uniface and semi-worked choppers, Noone, p. 136.

The uniface pebble implements form a specialized sub-group. They comprise the *semi-uniface* kinds which are trimmed either at one end, end and lateral margin, or end and both lateral margins, and the uniface or *Sumatra*-type. Their uses appear to have been chopping and scraping, although some bear signs of percussion on the edges and sometimes the surfaces.

The *Sumatra*-type (Fig. 21) is trimmed all over its upper surface, which is generally convex, and the margins show signs of use at various points. The lower surface of cortex is either flat or slopes upwards to the margins in such a manner that the implement has a lenticular cross-section. Tindale (1937, p. 47, fig. 8) used the term *sumatra*-like for the lateral-edged semi-uniface pebble implements from Kangaroo Island, and Jackson (1939, pp. 290–3, figs. 1–3) did likewise with specimens from Point Cartwright, Queensland. McCarthy (1938, 1940) used the term *Sumatra*-type for the uniface group as a



Figures 12-19. Slice and Uniface Pebble Implements, Singleton, N. S. Wales.

12. *Worimi* slice, bearing concave and nose at one end, and lateral margin trimmed from outer surface. 13. Split-pebble slice with notched working edge. 14-19. Uniface pebble implements with working edge on lateral margin (14, 19), and end (15-16, 18); No. 17 is worked all over one surface.

After McCarthy and Davidson, 1943, figs. 1-8.

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whole, but later (1941, 1943*A–D*) restricted its use to the complete uniface type as named by Stein Callenfels (1926, p. 184, pls. xix, xxiii), for which it is adopted here.

The uniface pebble implements are known to occur chiefly in the eastern and coastal parts of south-eastern Australia, as far west as Kangaroo Island in South Australia. In size they range to more than 20 cm. long. Cooper (1943, *A*, p. 348) cut down a sapling, 28 cm. in circumference, in four minutes, with a lateral-edged uniface pebble chopper 43 oz. in weight.

The split-pebble implements, previously classified as coroids, are more correctly slices and are described in that section of this work.

Biface Coroid Implements. (Figs. 23-24.)

It was not possible to separate the uniface and biface coroids in the references owing to authors not making any distinction between them, and the following list of references is for both kinds.

1885. Hand axe, Macpherson, pp. 113-9.
1899. Semi-biface coroid, Spencer, pp. 355-6, pl. xii, fig. 4.
1901. Axes, flaked or chipped edge, Kenyon and Stirling, p. 194 and table, pl. xxv, fig. 3.
1914. Axes or choppers chipped from both sides, Kenyon and Mahony, pp. 5, 11, 13; Hafted axe, Spencer, *A*, fig. 25, nos. 3-4.
1915. Boucher or coup-de-poing, choppers, Breton, p. 25.
1919. Pounding stones, Howchin, pp. 82-83.
1921. Core scrapers, grattoirs, Aurignacian caréné, Rostro-carinate, cores, horse-hoof, utilized, Horne, *A*, p. 15, figs. 90-2, 96-100; Choppee, pebble axes, Horne, *A*, pp. 10-11, figs. 34-37; Coup-de-poing, hand-axe or boucher, Horne, *A*, p. 10, figs. 30-2.
1922. Axes, both sides chipped, coup-de-poing or boucher, Spencer, pp. 74, 86.
1924. Hand-axe, Horne and Aiston, pp. 92-94, 101.
1927. Choppers, Doak and Doyle, p. 33; Planes, Kenyon, pl. xvi.
1929. Choppers, Spencer, Vol. II, p. 500, fig. 343; Hand-axe, Aiston, p. 130, pl. xxix.
1930. Core-like implements, Hale and Tindale, pp. 167, 169.
1934. *Buandik* biface, Campbell, p. 31.
1934. Hatchets, Howchin, pp. 46-8, fig. 64.
1935. Hand-axe, Davidson, pp. 156-7, fig. 4.
1936. Faustkeile, Fürer-Haimendorff, pp. 13, 16, 433, 438, pl. i, fig. 9.
1937. Bifaces, Pradenne, pp. 91-112, fig. I, no. 2, II, nos. 1-2.
1938. Ovates, hand-axes, McCarthy, p. 39.
1940. Core Implements, McCarthy, *A*, pp. 28, 30-2, pls. i, ii, figs. 3-6, grooved hand-axes, p. 42; Hand-axe or chopper, Mitchell, p. 184, pl. xvi, fig. 12.
1941. Hand-axes or choppers, coup-de-poing, McCarthy, *B*, pp. 260-1, figs. 1-4, 6, 7; Flaked choppers, Mitchell, p. 372; Untrimmed hand-axe, Mountford, pp. 312-6, fig. 2, pl. xx, figs. C, D; Biface implements, coup-de-poing, semi-biface, Tindale, *A*, pp. 145-6, *B*, p. 41; Hand-axes, unflaked and roughly trimmed cores for which name *'jali* proposed, Tindale, *B*, pp. 37-41, Pls. E, F.
1943. Semi-biface, bifaces, Campbell and Noone, *B*, p. 378, figs. 1-5; Sharp-edged stones, Love, pp. 215-7, pls. vi-vii; Pebble implements, semi-bifaces, Mahony, p. 37, pl. iii, figs. 3-4; Flint artifacts, Mitchell, pp. 61-2; Bifaces, Noone, *A*, pp. 273, 278, figs. 1-2.
1944. Untrimmed core implements, semi-worked bifaces, Noone, p. 136.
1945. *Buandik* biface, Stapleton, p. 281, figs. 1-2.

Biface coroids are nodules, pebbles or lumps of stone either partly or wholly trimmed on both surfaces. The partly trimmed examples are conveniently termed semi-bifaces. The larger examples are apparently hand-axes and choppers, but there are scraping and cutting implements, or edges used for these purposes, on implements among the biface coroids of both small and large size. Cleavers may also occur but have not yet been specifically determined. Many biface coroids are blanks and rejects prepared during the making of edge-ground axe-heads and adze-heads. In shape specimens in this subgroup vary from ovate to discoidal, cordiform to rectangular, and irregular forms are common. An interesting series of flint biface coroids (Fig. 24) occurs in the Mt. Gambier district of South Australia (McCarthy, 1940, *A*, Mitchell, 1943) which have been termed Buandik bifaces by Campbell (1934), the name Buandik being that of a tribe in whose territory the implements are found. The term is appropriate and should be retained.

Kodja (Fig. 329). —A specialized type from South and Western Australia.

1827. Kaoit, King, Vol. II, p. 139, figure.
1872. Hatchet, Evans J., pp. 151-2, fig. 106.
1877. Hatchet, Cox, pp. 22, 25.
1890. Tomahawk, Edge-Partington and Heape, Vol. I, p. 348, Nos. 2 and 5.
1897. Hatchet, Worsnop, pl. 51.
1901. Axe, Kenyon and Stirling, p. 193 and table; Hammer axe, Spencer, pp. 76-77, 79.
1903. Tomahawk, *Kod-ja*, Roth, *B*, pp. 58, 68, pl. vi, fig. 1; Axe, *Kadjo*, Clement, pp. 4, 7, pl. iii, fig. 13.
1914. Hatchet or hammer, Kenyon and Mahony, p. 5.
1916. Axes or tomahawks, Glauert, p. 44.

Figures 20-26. Coroids.

20-22. Uniface pebble implements trimmed on two lateral and end margins (20), Clarence River, N. S. Wales; all round (22), Snowy River above Jindabyne, N. S. Wales; all over one surface, the *Sumatra*-type (21), Windang, N. S. Wales. 23-24. Biface coroids. Quartzite (23), Western Australia, flint (24), Kongerong Hills, South Australia. 25-26. Nucleiform burins of quartzose rock, Bathurst, N. S. Wales.

0·3-0·5 nat. size. N. Adams, del.

1922. Hammer axe, Spencer, p. 85.
1925. Mounted axe, Spencer, p. 32.
1928. Double-headed axe, Thorpe and Stanley, p. 211.
1933. *Kodjah*, Hammond, p. 37, figure.
1936. Hammeraxt, Fürer-Haimendorff, p. 26, pl. II, fig. 16.
1938. Flaked or double-headed axe, Davidson, *A*, pp. 44-48, fig. 4.
1941. South-western axe, Tindale, *C*, pp. 70-71.
1943. Flaked hatchet, Noone, *A*, pp. 279-80.

The *Kodja* consists of two semi-discoidal or irregular sharp-edged biface lumps of stone, one of which may be suitable for hammering and percussive work, and the other or both for cutting purposes. These two pieces are set in a mass of gum-cement, one on each side, with the working face projecting a suitable distance. A thin, pointed and highly polished wooden handle is inserted into the middle of the gum, between the two pieces of stone. The name *Kodja* has already been generally adopted for this tool, and is from the Bunbury district of south-western Australia (Roth, 1903*B*). (*See* Addenda.)

Nucleiform Burins. (Figs. 25–26.)

1932. Nucleiform burinates, Campbell and Noone, *B*, p. 380, figs. 43-4; Burinate blocks, McCarthy, *A*, pp. 131-9; Nucleiform burinates, McCarthy, *C*, pp. 201, 203, figs. 5-8; McCarthy and Davidson, pp. 211, 214, fig. 70.

Occasional trimmed coroids occur which bear prepared burin edges or on which suitable edges have been used for burinate purposes.

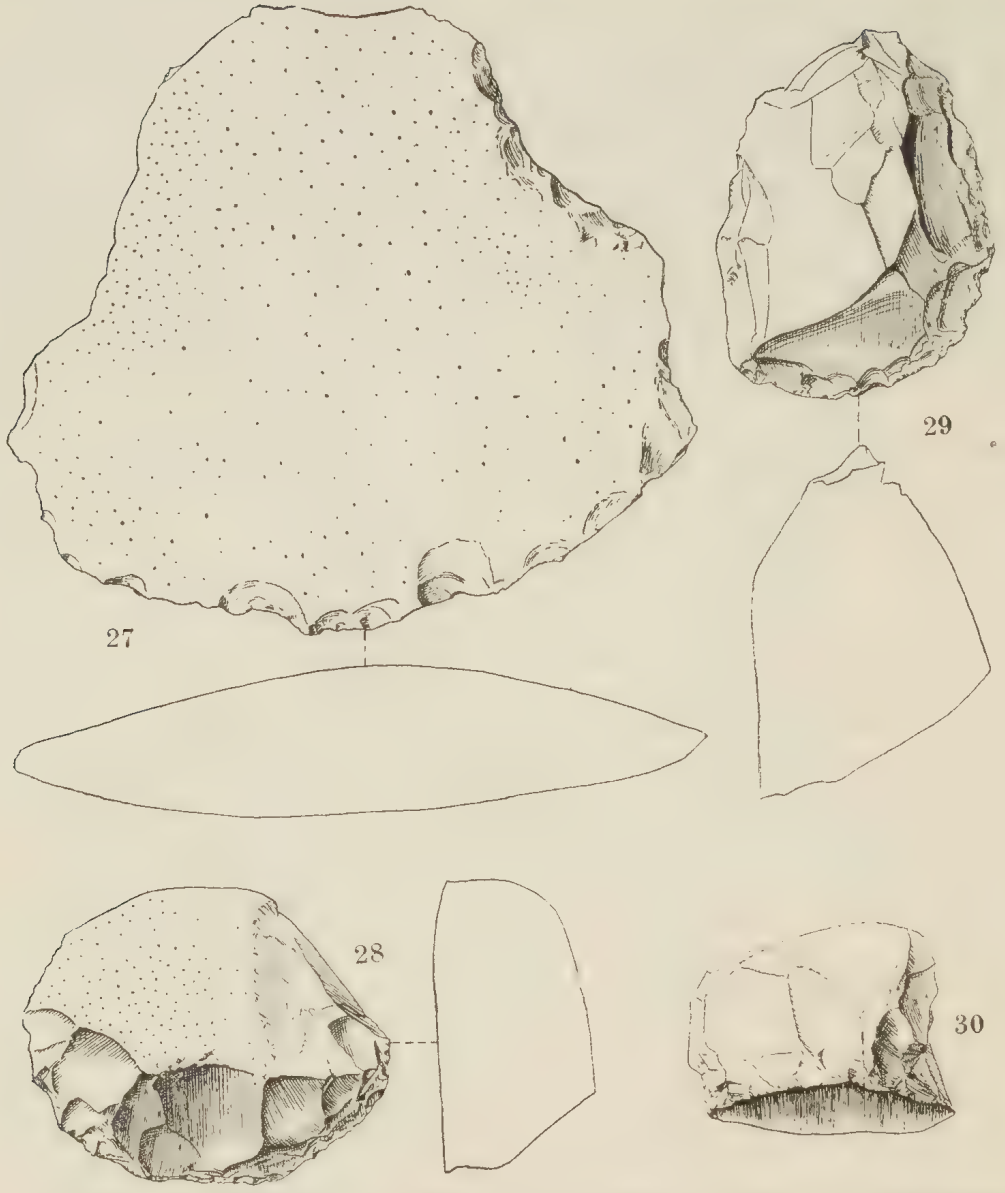
KNAPPED IMPLEMENTS.

This major group comprises blocks or thick flakes, slices, normal flakes and blades, and microliths. The striking-platform may be plain or faceted.

It is a difficult group to classify precisely, but it is considered that the sub-groups adopted are merited because of their importance in revealing the fundamental nature of an industry. Admittedly, the implements in each sub-group include marginal kinds which fall equally into several other sub-groups, and it is therefore necessary at present to adopt arbitrary lines of demarcation. The blocks, however, range from microliths to very large pieces, and can not be separated from the normal flakes and blades by measurement because each constitutes a distinct implement type in connection with which size is of no importance as a distinguishing factor. It is only in the case of specialized forms that a true distinction can be made. The difference between blocks and normal flakes and blades, generally speaking, is obvious to those who handle stone implements over a long period, and it is principally one of form and function. Implements in both sub-groups serve similar purposes, and to distinguish them as a whole by use does not throw as much light on the range of types as does the method adopted in this work. Some slices, too, may be regarded as large flakes or blades, and some of the latter may be classified as small slices, but generally speaking, slices will be found to exceed 9 cm. in length. The microliths, of course, are arbitrarily separated from the normal flakes and blades by a limit of 3 cm. in length but they sometimes exceed this size. It should always be stated in descriptions whether an industry contains a predominance of blocks, slices, normal flakes and blades, or microliths.

Blocks. (Figs. 25–26, 28–29, 33.)

1921. Core scrapers, Aurignacian caréné, Horne, *A*, p. 15, fig. 96.
1924. Hooked chopper, Horne and Aiston, pp. 92-4.
1927. Planes, Kenyon, p. 284, pl. xvi.
1928. Primitive flaked celts, flaked axe, Thorpe, pp. 243, 247, pls. xix, nos. 1-4; xxxi, 3; Crudely flaked celts, hand-axes, choppers, massive scrapers, Hall, pp. 277-9, pls. xxxvii-xxxviii.
1929. Hand-axe, Aiston, p. 130, pl. xxix.
1931. Slipper-type plane, Mitchell, p. 162.
1931-32. Tasmanoids, Thorpe, p. 78, figs. 1-3.
1932. Choppers, Cobb, *A*, pp. 85-6; massive flaked choppers, Thorpe, *B*, pp. 303-4, pls. xxvii, figs. 5, 9, xxviii, 1-5.
1934. Flaked choppers, Anonymous, p. 170.
1936. Flaked choppers, Fürer-Haimendorff, p. 22, fig. 18, pl. iii, fig. 19, nos. 5, 9.



Figs. 27-30.—27. Tanged slice. Quartzite. 28. Crowned block. Quartzite. 29. Keeled block, double side and end trimmed. Chert. 30. Conical core. Quartzite. Singleton, N. S. Wales. After McCarthy and Davidson, 1943, figs. 9-12.

0·5 nat. size. N. Adams, del.

1943. Blocks (crown, keeled, *worimi*, burinate, fabricators), McCarthy, *A*, pp. 131, 137-9, 151, figs. 9-11, 13, 15; *B*, p. 166; *C*, pp. 201, 203, figs. 16-18, 21; McCarthy and Davidson, pp. 211, 214-5, figs. 10-11, 22, 75-6.

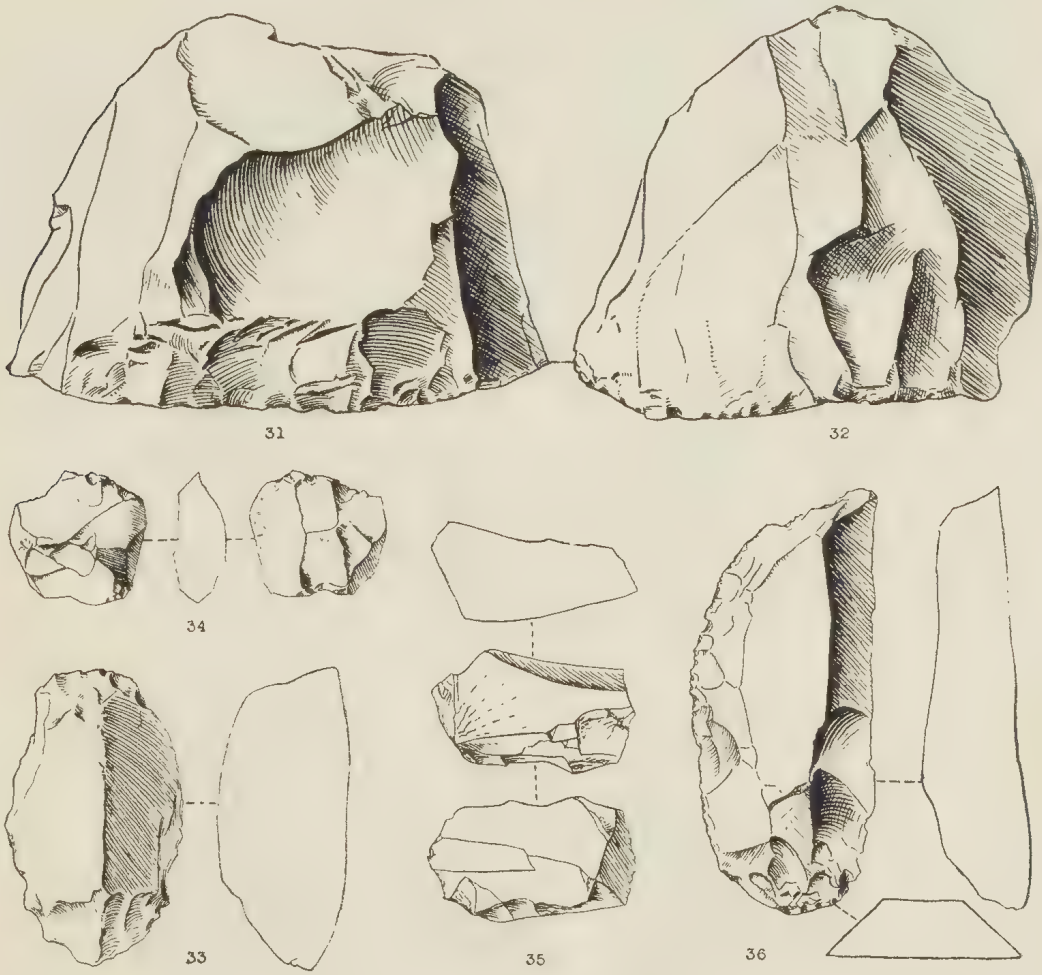
The working edge of blocks may be straight, semi-discoidal, discoidal, concave, nosed, serrated or burinate. Some bear casual percussive use. Blocks are divided into crowned (Fig. 28), keeled or carinate (Fig. 29), and irregular kinds. They vary greatly in size.

Specialized types are as follows:

Karta block (Fig. 37).—Referred to as *karta*, unless otherwise stated, in the list of references.

1921. Core-scrapers, Horne, *A*, p. 15, fig. 93.
1931. Trimmed flakes, Tindale and Maegraith, p. 281, fig. 6.

1937. Tindale, pp. 48-56, figs. 9, 14.
1940. McCarthy, *A*. p. 36.
1941. McCarthy, *A*, pp. 260-3, figs. 9-10; *F*, pp. 21-24, pl. vi, figs. 2, 9-10; Tindale, *A*, pp. 145-6.
1943. Campbell and Noone, *B*. p. 384; *Kartan*-type pebble implements, McCarthy, *B*. pp. 164-7, fig. 1, pl. xii, fig. 2.



Figs. 31-36.—31-32. *Horsehoof* nucleus, showing lateral and end views. Quartzite. Dubbo, N. S. Wales. 33. Carinate block, with trimmed edge at both ends. Quartzite. Shellharbour, N. S. Wales. 34. Biface discoid remnant of nucleus. Chert. Singleton, N. S. Wales. 35. Secondary nucleus. Quartzose rock. Bathurst, N. S. Wales. 36. *Leilira* blade. Quartzite. Lake Eyre, Central Australia.

0·5 nat. size. N. Adams, del.

Tindale and Maegraith (1931, fig. 6) and Tindale (1937, p. 48) described the *karta* found on Kangaroo Island, South Australia, as a crude implement made by trimming pieces of broken stone, some of which are deliberately knapped, so that the *karta* comprises both coroid and knapped forms. The examples figured by the above authors are from 8 cm. to 9 cm. in diameter. McCarthy (1941, 1943) applied the term to implements made from split-pebbles, with the working edge trimmed from the cleavage face, because they appeared to be the only type among pebble implements to which the name applied. This usage of the term may be incorrect and a re-description of the original specimens is necessary to define the type more clearly, otherwise the name will have to stand for the Kangaroo Island specimens only. Cooper (1943) omitted the term in his description of the large implements of South Australia.

Arapia block (Figs. 38–39, 71–81).—Referred to as *arapia*, unless otherwise stated, in the list of references.

1931. Trimmed flakes, Tindale and Maegraith, pp. 280-1, 286-8, figs. 6*a-c*, 7*a-c*, 10*a-c*, 11*a-c*.
1937. Tindale, pp. 48-56.
1940. McCarthy, *A*, p. 32.
1941. McCarthy, *B*, p. 257, fig. 4.
1943. Cooper, pp. 343-69, figs. 28-36; McCarthy, *C*, pp. 201-6, 209, figs. 12-22; McCarthy and Davidson, p. 227; Noone, *A*, pp. 277-8, fig. 24.

Tindale and Maegraith (1931, figs. 10–11), and Tindale (1937, p. 48), defined the *arapia* (Figs. 38, 39) as a discoidal flake, struck from a core with a prepared platform, and trimmed on portions of its periphery. No reference was made to size as a distinguishing factor, although the specimens figured are thick flakes or blocks. Cooper (1943) proposed a minimum length of four inches or 10 cm. for *arapia* to distinguish them from the *tula* adze-flake. The distinction between these two specialized implements, however, appears to be typological and functional; the *arapia* is a scraper and chopper used in the hand, and the *tula* is a specialized adze-flake mounted as a hafted adze

Figures 37-39. Blocks.

37. *Karta*, Hawk's Nest, Kangaroo Island, South Australia. 38. *Arapia*, Undala Soak, Central Australia. 39. *Arapia*, Durham Downs, South-west Queensland.
After Tindale and Maegraith, 1931, figs. 6, 10-11.

0·6 nat. size.

and used for scraping, cutting, engraving and chopping. McCarthy (1943, *C*, p. 203) suggested that the *arapia* (Figs. 71–81) is only one of a series of blocks, which comprises those trimmed on one or both lateral margins, or on one or both ends, and those with semi-discoidal and discoidal working edges. The latter form he considers to be the ideal type; it exhibits the greatest amount of trimming and use, and is, in effect, the *arapia* as first defined by Tindale and Maegraith but with its striking-platform completely trimmed away. This ideal type is widely distributed in the inland parts of the continent, and large specimens, oval or circular in shape, may exceed 15 cm. in length or diameter. They differ from the *horsehoof* block principally in thickness—they are relatively thin or low-crowned, but the *horsehoof* is thick and high-domed. As both types are apparently choppers, an arbitrary line of demarcation will be seen to exist between marginal examples of both kinds. The name *arapia* is that given to the implement, as defined by Tindale and Maegraith, by the Iliaura tribe of Central Australia.

Carinate (Figs. 29, 33).—References to these blocks will be found scattered through those given for blocks generally. Although keeled blocks are common in Australia, most of them are irregular in shape and are not specialized tools. The carinate block has a semi-discoidal working edge formed by a series of long, narrow flake-scars which converge and form a triangular face. Some are worked in this way at both ends and the two faces are joined by a median ridge or keel. Others have an unworked pointed end from which a ridge extends to the worked face.

Burins (Figs. 25–26).—Occasional blocks occur which have prepared burin edges or on which suitable edges have been used for burinate purposes. They are generally grouped with the coroid burins as nucleiform burins (Noone, 1934, p. 86) and the references will be found in the coroid section of the present paper.

Slices. (Figs. 12–13, 37.)

1916. Unground wedges, Dick, pp. 282-8, pls. xlix-l.
1940. Cleaver, McCarthy, *A*, pp. 31-32.
1943. Cleavers, Campbell and Noone, *B*, p. 378, figs. 16, 119; Cleavers or large knife-like implements, Cooper, *A*, pp. 343-69, figs. 84-87; Slice implements, McCarthy, *A*, pp. 131, 139, 151, figs. 14, 16; Cleavers, McCarthy, *C*, pp. 201, 203; Cleavers, McCarthy and Davidson, pp. 211, 214-5, fig. 9.

The working edge may be straight, semi-discoidal or discoidal, and often bears concaves and noses. The two principal kinds are those with (*a*) a scraping, and (*b*) a serrated or cutting edge, but both edge types may be found on the one slice. In shape they may be elongate, triangular, oval or discoidal, and are usually large blades. Both surfaces may be cleavage faces, or one may be cortex, and in some cases there is an outer face bearing flake-scars. The term cleaver appears to have been used previously in lieu of slice; to our knowledge occasional cleaver-like implements occur in Australia, but the only specialized cleaver as yet recorded is the *worimi*. In size slices are usually from about 9 cm. upwards in length.

The specialized types of slices are as follow:

Split-pebble slices (Fig. 13).—The list of referenes to split-pebble slices is incorporated in that for the uniface pebble implements in the trimmed coroid group because it has not been possible to separate them in descriptions, where they have usually been grouped together.

Split-pebble slices consist of one portion of a pebble or nodule split into two pieces by percussion. They bear either a negative or a positive bulb of percussion, although the latter may be partly or wholly trimmed away. The edges are either partly or wholly trimmed. A characteristic feature of these implements is an extensive and more or less flat cleavage face. The point of percussion may be on one end or on any part of the lateral margins, the most suitable place to strike the blow, usually the thickest part of the nodule or pebble, being selected by the workman. Split-pebble slices generally occur with the trimmed coroid uniface pebble implements and both kinds were probably used for the same purposes. The range of sizes is also similar, although the split-pebble slices form a lighter series.

Worimi Cleaver (Fig. 12).—Referred to as *worimi*, unless otherwise stated, in the list of references.

1921. Chipped-back and gigantic knives, Horne, *A*, p. 9, fig. 27.
1928. Crude choppers, Hall, p. 278, pl. xxxviii, figs. 1-2; *Elouera*, primitive flaked celts, massive chipped-back implements, Thorpe, pp. 243-5, pls. xix, figs. 2-3; xx, 1-3; xxi, 1-3.
1930. *Elouera*, Towle, pp. 3, 8-9.
1932. Massive flaked choppers, Thorpe, *B*, pp. 303-4, pl. xxvii, figs. 5, 9; xxviii, 2-5.
1934. Massive choppers, *Anonymous*, p. 171; Massive flaked implements, Goddard, pp. 191-3.
1936. Hackmesser, Fürer-Haimendorff, pp. 19, 22, fig. 18.
1941. Wedge-shaped hand-axes, McCarthy, *B*, p. 260, fig. 6; *Worimi*, McCarthy, *F*, pp. 24-5, pl. vi, fig. 11.
1943. Campbell and Noone, *A*, p. 293; McCarthy, *A*, pp. 131, 138-9; *B*, p. 165, pl. xii, figs. 3-4; *C*, pp. 201, 203, fig. 1; McCarthy and Davidson, pp. 211, 214, fig. 1.
1946. McCarthy.

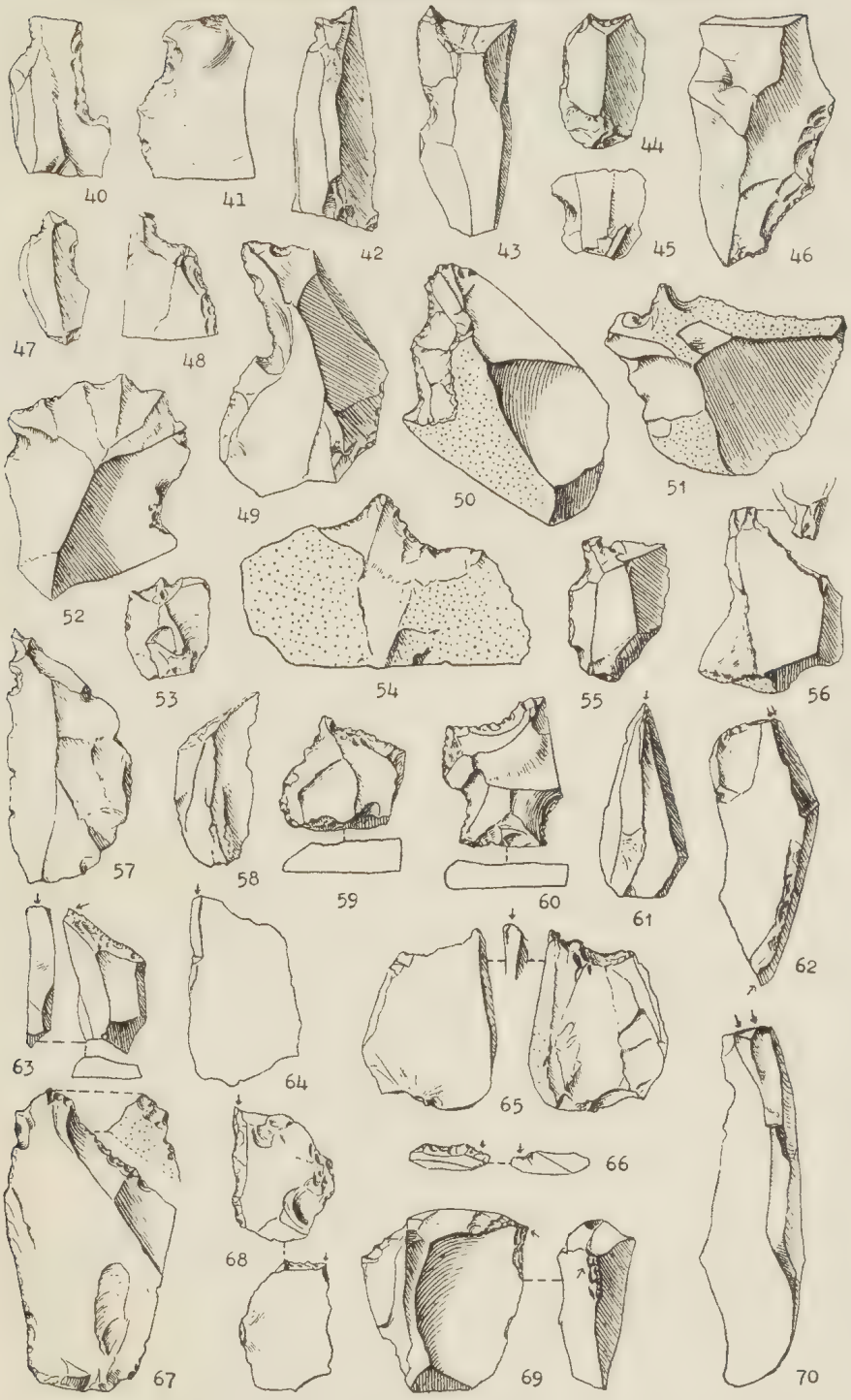
The *worimi* cleaver is a large, thick segment, markedly triangular or wedge-shaped in transverse section. The thick margin bears two edges and is often trimmed to a crescentic shape. The ends may have rounded or straight edges. Although all of the edges on both margins and ends may be trimmed or show evidence of use, the principal working edge is on the thin margin and on some specimens this edge is rounded by use-polish. The *worimi* bears a superficial resembance in form to the *elouera* and it was originally described by Thorpe and by Towle under the latter name. The essential difference between the two types is that the *worimi* is a heavy cleaver and chopper, whereas the *elouera* is a light scraper-knife and probably also an adze-flake. The name *worimi* was proposed by McCarthy (1941, *F*), and is derived from the name of a tribe on the north coast of New South Wales in whose territory (the Port Stephens and adjacent district) it is abundant and from where it was first recorded. In size the *worimi* ranges up to 19 cm. long, and one specimen is 7½ lb. in weight.

Normal Flakes and Blades.

This sub-group comprises a heterogeneous series of implements, comprising scrapers, knives, adze-flakes, piercers, burins, fabricators, and points. In size they range from about 3 cm. to 8 cm. in length, but the *Leilira-blade* is an exception in this respect.

Scrapers (Figs. 40–56, 71–95).—Referred to by all authors as scrapers, chips, flints, or flakes, unless otherwise stated, in the list of references.

1878. Smyth, vol. I, pp. 380-2, figs. 202-10.
1889. David and Etheridge, *B*, pp. 142-3, pl. xx, figs. 2*a*, 4.
1890-94. Etheridge, pp. 367-8, pl. xiii, fig. 13.
1892. Hammond, pp. 175-6.
1893. Etheridge, p. 23.
1894. Ferguson, pp. 87-90.
1896. Stirling, p. 98.
1897. Worsnop, pp. 110-3, pls. 53-55, 57.
1898. Edge-Partington and Heape, vol. III, pl. 130, nos. 1-4; pl. 143, nos. 11-2, 14.
1899. Spencer and Gillen, p. 594.
1901. Kenyon and Stirling, p. 194 and table, pl. xxvi, figs. 1, 4-9, 12; Spencer, pp. 75, 86.
1904. Gregory, pp. 128-9; Petrie, ch. xiii; Roth, sects. 26, 32, figs. 79-108; Spencer and Gillen, pp. 636-7.
1907. Etheridge and Whitelegge, pp. 241-4, 248-50, pl. xlii, group 1, xliii, 1 (fig. 41) and 2, xliv, 1, 3-5.
1909. Daley, pp. 498-502; Mulder, pp. 10-11.
1914. Kenyon and Mahony, pp. 6, 11-12.
1916. Glauert, p. 44.
1921. Scrapers, spokeshaves, spear-sharpeners, racloirs en coche, Horne, *A*, pp. 14-5, figs. 67-86; Pulleine, pp. 279-80.
1922. *Kalara*, Horne, p. 63, fig. 1 (left); Spencer, pp. 75, 86-7.
1924. Horne and Aiston, pp. 87-90, 93-4, 100-1, 107.
1925. Basedow, *B*, pp. 363-7; Bolam, p. 85; Spencer, p. 32.
1927. Barrett, pp. 295-6, figure (*Puralka* flint); Doak and Doyle, pp. 33, 38; Kenyon, pp. 281-4.
1928. Hall, pp. 260-9, pls. xxxiii-xxxiv; Spencer, Vol. II, p. 500, fig. 343; Russell, p. 130, figure; Unconventionalized flaked implements, Thorpe, pp. 244, 246-7, pls. xxii, fig. 3; xxiii, 2-5.
1929. Aiston, pp. 123-4, 126-7, pl. xxiii.
1930. Hale and Tindale, pp. 167-71, 173, 183, figs. 32, 38, 45-65, 67-97, 128-51, 190-202, 229.



Figures 40-70. Normal Flake and Blade Implements, Singleton, N. S. Wales.

40-48. Varieties of concave scrapers. 49-56. Varieties of nosed scrapers, showing the round, rectangular and pointed. 57-60. Varieties of piercers. 61-70. Burins: 61. Central or *bec-de-flute*. 62. Double burin, with concave spall opposed to concave spall at one end, and single spall opposed to flat surface at other end. 63-64. Bevel-scaled, with oblique line of scales opposed to vertical spall. 65. Concave-scaled. 66. Micro-burin or stigmate. 67-69. Counter-scaled, with scale opposed to scale. 70. Nucleiform burin.

The materials are cherts, jaspers and quartzites.

After McCarthy and Davidson, 1943, figs. 40-70. 0·7 nat. size. N. Adams, del.

1931. Thorpe, *A*, p. 286, figure; Tindale and Maegraith, p. 281.
1932. Kennedy, K., *A*, pp. 106-9; Thorpe, *A*, pp. 78-9; *B*, pp. 302-3.
1933. Cobb, pp. 163-5; Hammond, pp. 30, 38.
1934. Anonymous, p. 170; Howchin, pp. 48-60, figs. 65-86, 82-4, 94-6, 101-9; Kennedy, E., *A*, pp. 200-1; *B*, pp. 229-31; Kinsela, pp. 204-5; McCarthy, pp. 240-1.
1935. Davidson, pp. 152, 159-67, figs. 12-16; Conventionalized and unconventionalized scrapers, Towle, pp. 117-43, pl. I, figs. *b*, *d*; ii-vi.
1936. Fürer-Haimendorff, p. 14; Tindale and Mountford, p. 495.
1939. Croll, p. 14, fig. 3; Jackson, pp. 293-4, fig. 5; Moss, pp. 163-5.
1940. Mitchell, p. 184, figs. 6-8, pl. xvi.
1941. McCarthy, *B*, pp. 260-2, figure; Tindale and Noone, pp. 116-22, figs. 1-3.
1943. Campbell and Noone, *A*, pp. 293, 297-300, figs. 51-69; *B*, pp. 378-85, figs. 17-21, 37-40, 52-108, 113-4, 157; McCarthy, *A*, pp. 132, 139-43, figs. 21-30; *B*, p. 166, pl. xii, figs. 6-7; *C*, pp. 201, 204-7, 209, figs. 12-15, 19, 22, 24-28, 31-36, 40; McCarthy and Davidson, pp. 212, 217-20, figs. 17-18, 20-33, 35, 38, 40-56; Mahony, pp. 30-32, fig. 4; Mitchell, pp. 59-62, plate; Noone, *A*, pp. 271-80, 273, 275; Towle, pp. 73-5, pl. vi, fig. 1.

The majority of the worked normal flakes and blades fall into this category. They are usually classified by the evidence of use on one or more edges, and herein lies a contradiction in terms in the world-wide use of side for lateral margin or edge which will, apparently, continue to be the practice. The scrapers are called side, side and end, double side and end, end, semi-discoidal, discoidal, concave or nosed, and there are varieties among each kind. Some of the varieties are widespread and in general usage have been given special names although they are not true specialized types.

The end scrapers are of two kinds, the butt (Figs. 89, 92, 94–95) and the distal end, while some specimens may be worked at both ends. The working edge may be straight, oblique, convex, concave or gouge-like. Some bear one or more noses. Terms such as duck-bill, parrot-beak, ogival, and the like refer to shape but should be used with great care; thus duckbill, as McCarthy (1943, *A*, p. 143, footnote) has pointed out, has been used incorrectly in Australia for the nosed scraper. Double side and end scrapers are sometimes called tongue-shaped scrapers. It should be noted that concaves (Figs. 40–48) and noses (Figs. 49–56) occur on many kinds of scrapers in conjunction with other working edges, but they also occur either singly or together on flakes without any other trimming or signs of use and on various parts of the margins. The nose may be rounded, triangular and pointed, or rectangular and straight-edged. The dimensions of concaves and noses should be stated in descriptions because their size is often an indication of their use. The abrupt-trimmed blades (Fig. 88) appear to be a specialized type in some localities, and they are often thin blades with ends rounded by trimming.

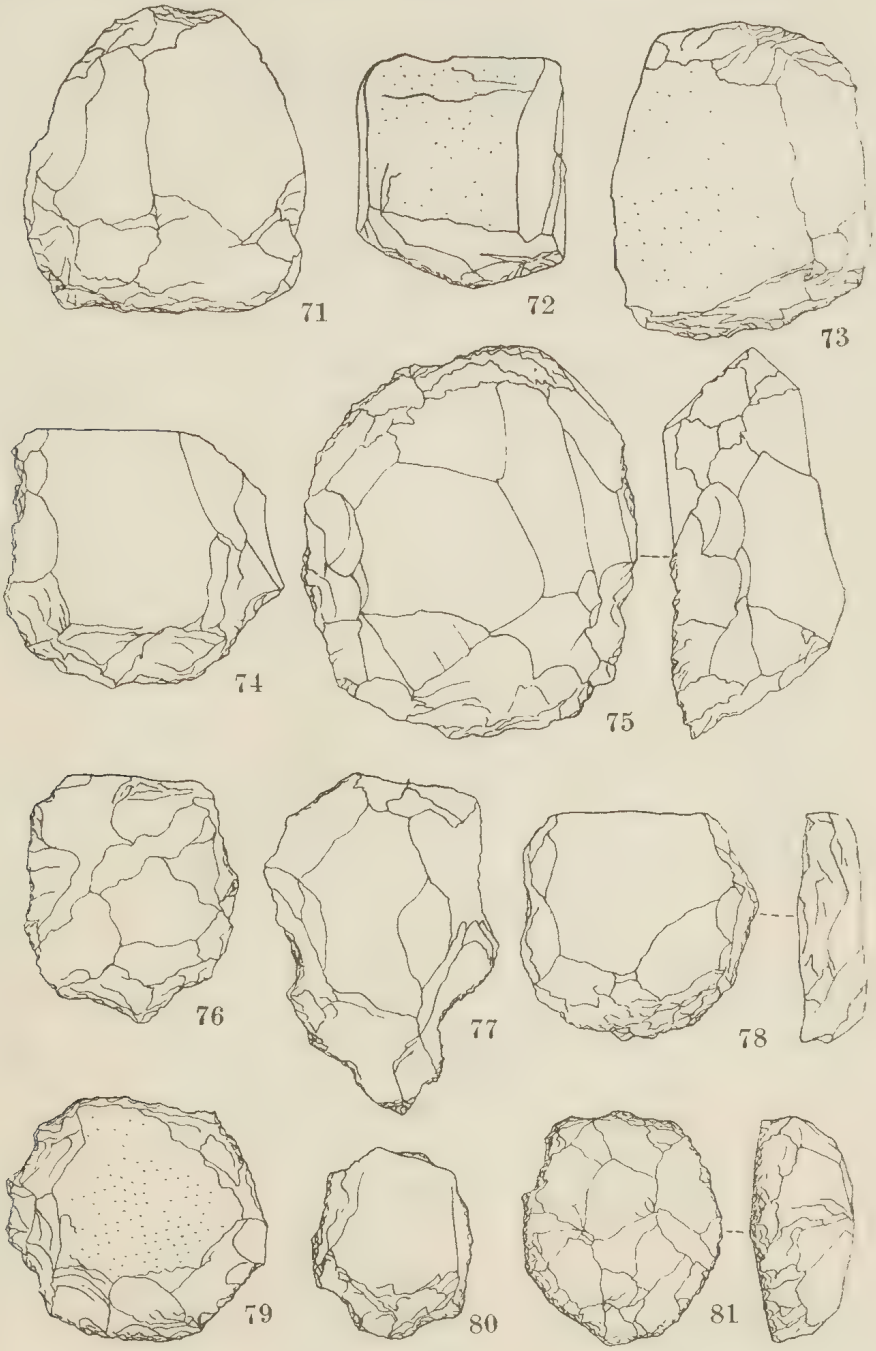
Important local differences in the form of flakes exist in Australia, as Towle (1935) has shown for New South Wales, where there occur asymmetrical flakes along the coast and symmetrical flakes in the far west, but their significance is not yet fully understood. More comprehensive data are required to decide whether such differences in form are due to the materials used or to the knapping techniques employed.

The *Raclette* (Fig. 103) might be distinguished as a specialized type. It is typical of the Early Magdalenian culture of France. It is a small, flat, broad and thin flake trimmed abruptly on part or the whole of the margin. It is uncommon in Australia, Noone's (1943, *A*, p. 299) being the only reference.

Knives.—Referred to as knives or cutting implements, unless otherwise stated, in the list of references.

1878. Cicatrization chips, Smyth, Vol. I, pp. 295, 380, figs. 200-1, 208-10.
1895. Mathews, pp. 304-5.
1896. Stirling, p. 98.
1897. Roth, sect. 257, figs. 386-90; Worsnop, pp. 110-3, pls. 53-55, 57.
1899. Spencer and Gillen, p. 592.
1901. Kenyon and Stirling, p. 194 and table, pl. xxvii, figs. 1-6, 10-11; Spencer, pp. 71, 79-80.
1903. Clement, pp. 7, 9, 11-12.
1904. Petrie, pp. 30-31, 47, 56, 84-85, 105; Lancet flakes, knives and saws, Roth, sects. 24, 26, 32, figs. 35-36*a*, 132, 135-40.
1907. Etheridge and Whitelegge, p. 241.
1908. Eylmann, p. 365, pl. xxiii, fig. 3.

1909. Mulder, pp. 10-11.
1914. Kenyon and Mahony, pp. 5-6; Spencer, *B*, p. 77.
1916. Glauert, p. 44.
1921. Knives and Levallois flakes, Horne, *A*, pp. 7-8, 11, figs. 1-17, 39.
1922. Horne, pp. 64-5, figs. 2, 6; Spencer, pp. 74-75, 87, 121.



Figures 71-81. Scrapers and *Arapia*-like blocks, Bathurst, N. S. Wales.

71-72. Distal end trimmed. 73. Double end trimmed. 74. Side and end trimmed. 75-76. Double side and end trimmed. 77. Keeled, double side trimmed, with several concaves. 78. Semi-discoidal edge. 79-81. Discoidal trimmed edge, with concaves and noses. Quartzose rock. After McCarthy, 1943*c*, figs. 12-22.

0·7 nat. size. E. Bramell, del.

Figures 82-108. Normal Flake and Blade Implements, N. S. Wales.

1924. Horne and Aiston, pp. 87-88, 97, 99.
1925. Initiation stones, Bolam, p. 85; Hale and Tindale, pp. 68-69, 95, figs. 41*a-c*; Spencer, p. 32.
1927. Doak and Doyle, p. 33; Kenyon, p. 285.
1928. Spencer, Vol. II, p. 500.
1929. Aiston, pp. 128, 131, pl. xxvii.
1932. Kennedy, K., *A*, pp. 106-9; Thorpe, *B*, pp. 302-3.
1933. Cobb, pp. 163-5.
1934. McCarthy, p. 241; Howchin, pp. 28-41, figs. 8-58.
1935. Davidson, p. 163; Towle, pp. 117, 119, 121, 137.
1936. Klingen, Messer, Beschneidungsinstrumente, Fürer-Haimendorff, pp. 9, 15, 20, 31, 33, 433, 437, 450-1, pl. ii, fig. 15.
1939. Jackson, pp. 293-4, figs. 4, 6-7; Moss, pp. 163-5.
1941. McCarthy, *B*, p. 261, fig. 2; Tindale and Birdsell, p. 8.
1943. Campbell and Noone, *B*, p. 378, figs. 6-15; McCarthy, *A*, pp. 132, 144, 151, fig. 20; *C*, pp. 201, 207; McCarthy and Davidson, pp. 212, 221, 228, figs. 34, 36, 39.

Many normal flakes and blades classified as scrapers were undoubtedly employed also for cutting but they are frequently indistinguishable. In addition, many flakes and blades with sharp natural edges used for cutting soft materials show no signs of use. Flakes and blades with long edges trimmed at a low angle, or along which minute scales have been detached by use on both facets (usually on a thin blade) are usually identified as knives. The serrated edge (Figs. 97–98) may consist of minute or large spurs or teeth separated by notches and concaves, and these pieces are often referred to as saws. The above kinds are recorded from all over Australia.

The special kinds of knives used for ritual operations such as cicatrization, circumcision (Fig. 290), subincision, blood-letting and duelling can only be identified when their use is witnessed because other implements are apparently used for the same purposes. Horne and Aiston (1924) figured an unworked leaf-shaped flake (Fig. 290) from the Lake Eyre district of Central Australia which was used for circumcision. This group is little understood and a detailed description of the known specimens is required.

Scraper-Knife: Elouera (Figs. 82–87).—Referred to as *Elouera*, unless otherwise stated, in the list of references.

1928. Chipped-back knives, Hall, pp. 270-6, pls. xxxv, Q-R; xxxvi, S-V.
Chipped-back implements, Thorpe, pp. 245-6, pl. xxiv, figs. 1-5.
1929. Chipped-back knives, vaginal knives, *mernie wadna*, Aiston, 125-30, pls. xxiv, xxvi.
1930. Towle, pp. 3-16, pls. i-vii.
1931. Turner, *A*, p. 3; Illawarra chipped-back knife, Turner, *B*, pp. 30-5, figs. ii, iv.
1931-32. Thorpe, pp. 78-9, 88, figs. 1-7.
1932. Kennedy, K., *A*, pp. 106-9; Thorpe, *A*, p. 88.
1933. Cobb, p. 164.
1934. Kennedy, E., *A*, pp. 200-1; Asymmetrical crescentic scraper, McCarthy, pp. 240-1.
1935. Towle, pp. 117-43, pls. i, fig. *b*; ii-iii; iv, *a-d*.
1939. Chipped-back scraper, Jackson, p. 293, fig. 5; chipped-back knife, Walker, p. 28.
1941. McCarthy, *B*, p. 260, figs. 5, 7; Mitchell, p. 373; Tindale, *A*, p. 146.
1943. Campbell and Noone, *A*, p. 293; *B*, p. 382, figs. 111-2; McCarthy, *A*, pp. 129-30, 132, 139-40, 151-2, figs. 17-9, 144; *C*, pp. 202, 204, 209, fig. 23; McCarthy and Davidson, pp. 211-2, 217, 227-30, figs. 13-6, 19; Noone, *A*, p. 278.

Figures 82-108. Normal Flake and Blade Implements, N. S. Wales.

82-83. *Eloura*, type i, Singleton. 84. *Eloura*, type ii, Boat Harbour. 85-87. *Eloura*, type iii, Bellambi and Singleton, 88. Abrupt-trimmed blade. Singleton. 89. Double side and end scraper, with oblique concave on butt end. Singleton. 90. Side scraper, Singleton. 91. Double side scraper with one lateral margin trimmed on inner face. Singleton. 92. Butt-end scraper, Singleton. 93. Oblique trimmed scraper. Bathurst. 94-95. Butt-end scrapers, Bathurst. 96. Nosed blade of graver type, Murramarang. 97-98. Serrated blades, Singleton. 99. Concave scraper, Lake Illawarra. 100. Notched blade, Singleton. 101. Flake fabricator, double side type, Singleton. 102. Flake fabricator, punch-type, Bathurst. 103. Raclette, South Australia (after Noone). 104-106. Adze-flake slugs, Burren Junction. 107. *Tula* adze-flake, unused, Lake Eyre, Central Australia. 108. *Tula* adze-flake, used slug, Lake Eyre, Central Australia. The materials are chert, jasper, and quartzite.

After McCarthy, 1943.

0·7 nat. size. N. Adams, del.

The *elouera* is a segment, triangular in transverse section, which bears scraper trimming on one or both edges of the thick margin, and either scraper trimming or evidence of cutting use on the thin margin (McCarthy, 1943, *A*, p. 139, figs. 17–19). The latter edge is untrimmed and shows no signs of use on many specimens. The three main varieties are distinguished by the signs of trimming on the thick margin, as follow:

i. Margin trimmed on one or both edges, butt and distal ends untrimmed. (Figs. 82–83.)

ii. Margin wholly or partly trimmed on one or both edges, distal end trimmed and often crescentic or pointed, butt untrimmed. (Fig. 84.)

iii. Whole of margin, including butt, trimmed, frequently on both edges, and often pointed at both ends. This is the ideal type, and it is often of orange-segment form. (Figs. 85–87.)

Elouera vary considerably in shape. The thick lateral margin is generally crescentic, but may be straight or irregular. The thin margin ranges from concave to convex, but is often straight. The majority of *elouera* are elongate blades, but others are approximately quadrangular, rectangular, or roughly triangular in shape. Towle (1935, pp. 132–6) drew attention to the large number of gradations that exist among *elouera*, and it may be stated that the ideal type is the end-product of a series of partly worked varieties. The *elouera* is up to 10 cm. long.

The name *elouera* was proposed by Towle (1930, p. 8) and is one of the derivations of Illawarra, a district on the south coast of New South Wales.

The *elouera* occurs mainly in the eastern and coastal parts of New South Wales, but it has been recorded from scattered localities in far western New South Wales, South Australia, and along the Queensland coast.

Utilized.

1943. Utilized flakes and blades, McCarthy, *A*, p. 143; *B*, p. 204; McCarthy and Davidson, p. 217.

Utilized flakes and blades bear both scraping and cutting edges on various parts of their margins. Some blades have a knife edge on one lateral margin and a scraping edge on the other margin. They occur throughout the continent.

Adze-Flakes. (Figs. 104–109, 324–325, *see* Addenda.)

1878. Chisel, gouge or adze, Smyth, vol. I, pp. 358, 379, fig. 199.
1890. Chisels, Edge-Partington and Heape, vol. I, pl. 348, no. 6, pl. 354, no. 19.
1895. Chisel, Liversidge, p. 238.
1896. Adze or chisel, Stirling, pp. 93-5, 98, pl. vi, fig. 2.
1897. Chisels, Roth, sect. 149, figs. 235-6; Chisel or gouge, Worsnop, pp. 110, 114, pl. 53, fig. 3, pl. 56, fig. 3.
1898. Chisels, Edge-Partington and Heape, vol. III, pl. 128, pl. 130, nos. 6-7, 13.
1899. Adze, Spencer and Gillen, pp. 594-5.
1901. Adzes or gouges, chisels, Spencer, pp. 19, 71-73, 80, pl. ii, fig. 21.
1904. Pot-lid flakes, gouge, chisel, adze, Roth, sects. 23, 27, figs. 38-40*d*, 101, 107-8; Adze, Spencer and Gillen, pp. 636-40, figs. 172-6, 283.
1908. Scrapers, hafted adze, Eylmann, pp. 364-6, pl. xxiii, figs. 1-2, 4.
1914. Adzes or gouges, Kenyon and Mahony, p. 6.
1915. Hafted adze or chisel, Hamlyn-Harris, p. 168.
1916. Gouges, Glauert, p. 44.
1921. Hafted gouge, Howchin, pp. 280-1.
1922. Adzes or gouges, chisels, Spencer, pp. 75, 77-78, 87, pl. xv, figs. 155-6.
1924. *Tuhla* and *kalara* end-scrapers, Horne and Aiston, pp. 89-90, 101-4, figs. 66, 74, 77, 106-8.
1925. Chipped adze, Basedow, *B*, pp. 366-7; Bolam, pp. 85-86.
1927. Chipped gouge or adze, Kenyon, pp. 283-4, pl. xvi; Adzes, Spencer and Gillen, vol. II, p. 538, figs. 158, 186-90.
1928. Adze, Spencer, vol. II, pp. 501-2, figs. 344-50.
1929. *Tuhla*, Aiston, pp. 127-8, pls. xxi-xxii; *Mernie wadna*, Aiston, pp. 125-6, pl. xxiv.
1930. *Tula*, and high-backed implements (Burren slugs), Hale and Tindale, pp. 135-7, 158-9, 183, 190-1, 195, 204, 207-8, figs. 45-59, 66-76, 79-87, 128-30, 190-7.
1934. Chisels, gouges, and adzes, Howchin, pp. 41-6, figs. 59-63; *Tuhlas*, Mitchell, p. 256.

1935. Adze-points, Davidson, pp. 152, 160-1, 165, 167, 180, figs. 5-11; Towle, pp. 121-32, pl. vi, fig. *c*.
1936. Blade, Davidson, pp. 465, 467-8, 474, figs. 4*f*, 6*e-f*; *Tula*, Fürer-Haimendorff, pp. 18, 36, 433, pl. i, fig. 14.
1937. Adze-stones, Tindale, p. 54.
1939. Scrapers, Croll, p. 14, fig. 3.
1940. Hafted chisels, McCarthy, *B*, p. 249.
1941. *Tula*-chisel, McCarthy, *A*, p. 261, figs. 5-6; discoidal adze-stones, Cooper, pp. 3-4; Adze-stones, Mountford, pp. 312, 315-6, fig. 3; Adze-stone, Tindale, *A*, p. 146; Flake-adze, Tindale and Noone, pp. 116, 119.
1943. Adze-flakes, *Merna wadna* or *Koondi pirri*, Campbell and Noone, *A*, pp. 283, 290-1; Pointed slugs, adze-flakes, *tula* and *Adelaide* types, Campbell and Noone, *B*, pp. 380, 384-5, 389, figs. 59-63, 109-10; Discoidal adze-flake or *tula*, Cooper, *A*, p. 354; Adze, Love, pp. 216-7, pls. vi-vii; *Tula*, McCarthy and Davidson, pp. 218-9, 227, fig. 21; Discoidal, slug, *elouera*, *tula* and *Adelaide* adze-flakes, Noone, *A*, pp. 275, 277-9, figs. 13-14, 23; Adze, Towle, 1943, p. 73.
1944. Adze, Dunbar, pp. 146-8; Adze-flake or gouge, Noone, p. 138.

The adze-flakes include only those implements which are mounted on a handle or a spear-thrower for use as an adze, chisel, graver, scraper, and knife. Many writers have stressed the wide range of uses of these implements and their great importance in the tool-box of the aborigines throughout the continent. Some adze-flakes are simple untrimmed or trimmed irregular flakes, but most of them are specialized types as described below. Ordinary scrapers may also be mounted in gum and used temporarily as Horne and Aiston (1924, p. 90) have pointed out in regard to the *kalara* scrapers of the Wongkonguru tribe in the Lake Eyre district of Central Australia; the *kalara*, they state, vary from *tula* to square-ended and gouge-like scrapers and are mounted in gum for making the flutings or grooves on shields, boomerangs and containers.

Hunter stated (1793, p. 452) that the Buruberongal tribe, which occupied a territory in the area where the Hawkesbury River becomes the Nepean, used a hard stone flake gummed on the end of their spear-throwers as a hafted adze to shape their spears. Lieutenant Wm. Bradley (*Manuscript Journal*, October, 1788, pp. 129–130, in the Mitchell Library, Sydney), in describing the customs of the aborigines of the Sydney area, recorded that the adze is made of the same stone and secured to a stick in a similar manner as the hatchet. Unfortunately, the type of adze-flake is not described in enough detail to make possible its identification, but the question is raised as to whether it was the *elouera* scraper-knife so common along the coast of New South Wales.

The specialized types are as follow:

Tula adze-flake (Figs. 107–108, 325).—A semi-discoidal or tongue-shaped adze-flake with a convex or flat cleavage face and a broad, angled striking-platform. The outer face, which may be keeled or flat as in Queensland, is frequently concave. In the latter form the outer face consists of a flake-scar which resembles that of a struck tortoise-core. When re-edging and use have worn the *tula* down to a narrow strip of the butt end it is discarded. In size the *tula* ranges up to about 10 cm., and Cooper (1943, *A*, p. 354) has suggested that this dimension be made their maximum to distinguish the *tula* from the *arapia* block, a question which has been discussed in the latter section. The name *tuhla* was recorded by Horne and Aiston (1924, pp. 89–90, 101–4, figs. 66, 74, 77, 106–8) in describing the stone implements of the Wongkonguru tribe, Lake Eyre district, Central Australia, and it was changed to *tula* by Hale and Tindale (1930).

Merna-wadna adze-flake (Fig. 109).—A segment of orange-quarter form, pointed at both ends, and worked all over the outer face or thick margin. It is often a stout and rudely trimmed implement. There is every possibility that the *merna wadna* is an *elouera* because Campbell and Noone (1943, p. 278) have described *elouera*-like adze flakes from South and Western Australia, and its characteristics are almost identical with those of the *elouera*. A reconsideration of the original specimens is desirable to ascertain whether the type should stand or be included with the *elouera*. The name *merna wadna* was recorded by Horne and Aiston from the Wongkonguru language, Lake Eyre district, Central Australia (*see* Addenda).

Fig. 109. *Merna-wadna* adze-flakes, Lake Eyre district, Central Australia. After Aiston, 1929, Pl. xxiv. Nat. size.

Burren adze-flake (Figs. 104–106, 325).—An elongate, narrow keeled blade, triangular in section, and heavily worked on both lateral margins up to the median keel. The two sides are steep-faced, and the lower surface is more or less flat. The ends are pointed or possess a very narrow working edge which may be straight or rounded. They are mounted in such a manner, to judge by a hafted example in the Australian Museum, that one end projects from the gum-cement, probably for graving and incising work. The implement described as a *koondi tuhla pirri* by Horne and Aiston (1924, pp. 90–91) appears to be a slug and not a *pirri point*. In size the adze ranges from about 3–8 cm. in length, and it is frequently microlithic. The name is derived from the type locality, Burren Junction, N. S. Wales. It occurs in the Tartanga and Devon Downs deposits.

Adelaide-type adze-flake.—Noone (1943, *A*, p. 279), quoting N. B. Tindale, defined this adze-flake from South Australia as usually of irregular quadrangular or triangular form, the main working edge being frequently straight and formed on the side margins of the flake.

Leilira-blade. (Figs. 110–116, 121–122, 330.)

1872. Quartzite knife, Evans, p. 264, fig. 198 (2nd ed., 1892, p. 293, fig. 198).
1878. Quartzite knife, Lubbock, 4th ed., pp. 91-2, fig. 93; Trigonal knives, Smyth, vol. I, p. 380, figs. 200-1.
1890. Quartzite knives, spear-heads, picks, Edge-Partington and Heape, vol. I, pl. 361, nos. 1-3, 6-8; pl. 126, nos. 1-4; *Mika*-knife, axe, Etheridge, pp. 251-8, 289-91, 368-9, pls. ix, x, figs. 1-5, xi, 8-10, xii, 14.
1891. Knives and spear-heads, Etheridge, pp. 31-4, 37-8, pl. iv, figs. 2-3, pls. v-vii.
1896. Knives and pick-shaped weapon, Stirling, pp. 93, 96-8, pl. vi, figs. 1, 4.
1897. Knives and spear-point, Roth, sects. 251 and 257, figs. 386-9; Hatchet or tomahawk, spear-points, Worsnop, pp. 97-9, 110, pl. 52, fig. 1, pl. 63.
1898. Knives, spear-points and picks, Edge-Partington and Heape, vol. III, pl. 130, fig. 11.

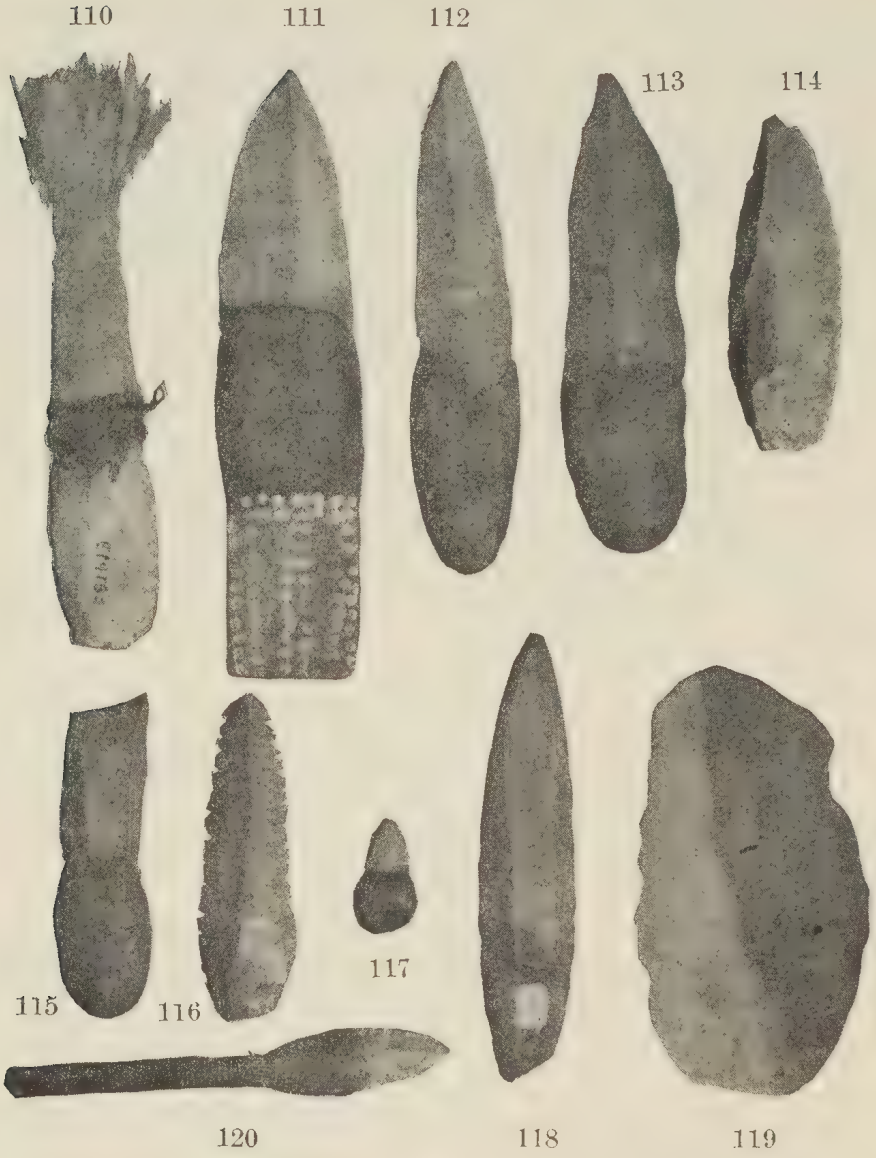
1899. Pick-shaped weapon or flaked axe, knives, Spencer and Gillen, pp. 590-3, fig. 117, nos. 4-5, 6-10.
1901. Flaked-edge axe, knives, spearheads, Kenyon and Stirling, pp. 193-4 and table, pls. xxvi, fig. 2; xxxiii, 3; Knives, spearheads, flaked axes or picks, Spencer, pp. 73-5, 79, 87, figs. 156-8.
1903. Quartzite knife, Myres, p. 16, pl. C.
1904. Knives, spearheads, Roth, sects. 32, 24, figs. 41-46, 132, 134-41; Flaked knives, spear-heads, picks, Spencer and Gillen, pp. 635, 640-56, 674-6, 710-1, figs. 177-97, 233-5, 284, diagram A.
1908. Quartzite spear-points, picks, knives, Eylmann, pp. 332, 356-8, 364, pls. xviii, figs. 7, 11; xxi, 1, 3-5; xxii, 11.
1911. Knives, Sollas, pp. 262-5, figs. 129, 135-6.
1914. Quartzite flaked knives, pick hatchets, Kenyon and Mahony, pp. 5-7; Quartzite flaked knives and flaked picks, Spencer, *B*, figs. 22-3.
1915. Knives, Hamlyn-Harris, p. 95, figs. 167-8.
1916. Hafted stone knives, Glauert, p. 44.
1922. Long flaked knife, Horne, p. 64; Knives, flaked axes or picks, spearheads, Spencer, pp. 37, 74-5, 78-83, 121-2, figs. 160-1, 165-7.
1924. Fighting knives and Arunta knives, Horne and Aiston, pp. 87-8, 94-8, figs. 69-72.
1925. Knife, Basedow, *B*, pp. 364-5; Quartzite knife, Hale and Tindale, p. 95, fig. 41; Quartzite flaked knives and picks, Spencer, p. 32, figure.
1927. Quartzite knives (*Leilira*), picks and spearheads, Spencer and Gillen, vol. I, pp. 308, 312-20; vol. II, pp. 535, 540-8, figs. 192-211.
1928. Knives, pick-like axe, spearheads, women's knife, Spencer, vol. II, pp. 495, 502-11, figs. 352-74.
1929. Fighting knives, Aiston, pp. 128-9.
1931. Quartzite knife, Turner, *B*. pp. 31-2, fig. 1.
1934. Stone-headed spear, Davidson, p. 49.
1935. Quartzite blades, Davidson, pp. 152, 166-80, figs., maps; long flaked knives, Towle, pp. 123-7, 140, fig. 2*d*.
1936. Flint blade, Casey, pp. 91-2, fig. 2; Speerspitzen, Fürer-Haimendorff, pp. 34-5, 454, figs. 35-6; Quartzite spearheads, McCarthy, *B*, p. 13; Quartzite flake spearheads, Thomson, p. 74.
1940. Flint blade, Casey, p. 27; Quartzite knives and spear-points, McCarthy, *B*, pp. 252, 306.
1941. Quartzite blade, McCarthy, *B*, p. 261, figure; Pointed blade, Tindale and Noone, pp. 120-1.
1943. Quartzite knife blades, Noone, *A*, p. 272.
1944. Flake pick and quartzite blades, Noone, pp. 136, 138.

The *Leilira*-blade is elongate, and usually triangular or trapezoid in transverse-section. The lateral margins at the butt end may be rounded by trimming. The striking-platform is plain. Those used by the men are frequently trimmed from the edge to the keel, or to a ridge near both margins of the upper surface; this trimming extends from the point and sometimes joins that at the butt end, but in this case is limited to the edge along the greater part of the margins. The distal end is pointed on the men's knives but may also be a thin untrimmed straight or oblique edge. Those used by the women as knives (Figs. 121–122) are rounded at the distal end by trimming and resemble the carinate scraper. Many *Leilira*-blades are (*a*) fitted with a grip of gum-cement, into which is often inserted a short piece of flat wood bearing painted ornamentation, (*b*) mounted as spear-heads, and (*c*) fitted with a withe handle and used as fighting pick-axes (Fig. 330). Most of them are made of quartzite, but sometimes slate and other stones are used. They range up to about 20 cm. long and 6 cm. wide. These blades have been described in detail by Spencer and Gillen in their various works.

Piercers. (Figs. 57–60.)

1898. Drill, Roth.
1904. Drill, Roth, sect. 40, figs. 172.
1925. Awls or piercers, Basedow, *B*, p. 365.
1934. Points, drills or borers, Howchin, pp. 60-3, 68, 77, figs. 101-9, 121-2, 143-6.
1943. Piercers, Campbell and Noone, *B*, pp. 379-80, figs. 37-40; McCarthy, *A*. pp. 132, 144-5, 149, 151, figs. 33*a-b*, 63; *B*, p. 294; *C*, pp. 201, 207; McCarthy and Davidson, 220, figs. 57-60.

The piercer may be pointed, spatulate or rounded, and either plano-convex or concavo-convex in transverse-section. More than one piercer frequently occurs on the margins and corners of flakes.



Figures 110-120. *Leilira* blades, and Points.

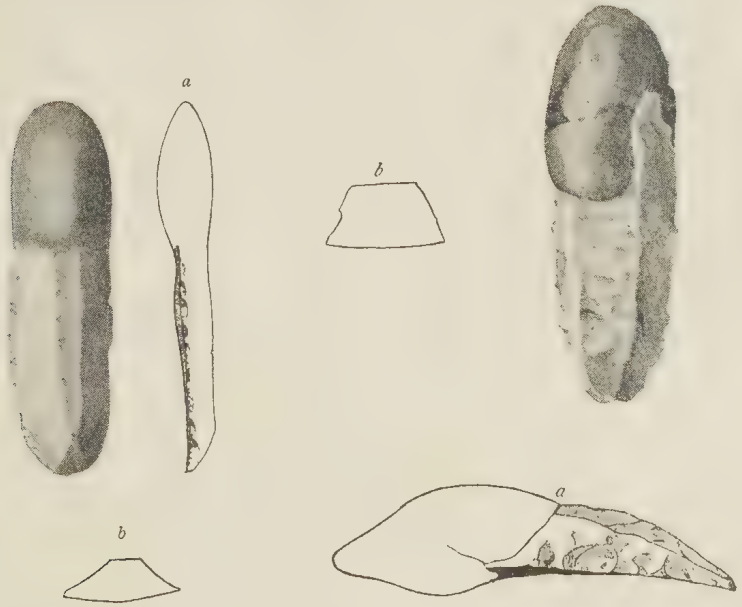
Nos. 110-116. *Leilira* blades. 110. Trimmed on both lateral margins at butt end, sheath of feathers and twine. Quartzite. Wollogorang, South-west Queensland. 111. Wooden handle and gum grip. Quartzite. Warramunga tribe, Northern Territory. 112-113. Gum grip. Chert and Quartzite. Lawn Hills, Queensland. 114. Trimmed right along both lateral margins. Quartzite. Wilson River, south-west Queensland. 115. Straight distal end, gum grip. Chert. Urandangie, Queensland. 116. Serrated lateral margins. Quartzite. Headwaters of Prince Regent River, Kimberleys, Western Australia. 117. Uniface serrated point with gum grip. Port Darwin, Northern Territory. 118. *Wanji* Point. Slate. Arnhem Land. 119. Blade trimmed along both lateral margins, of type associated with *Leilira* blades. Gregory River, northern Queensland. 120. Kimberley biface serrated point mounted in gum as a spear-head. G. C. Clutton, Photo. 0·3 nat. size.

The drill forms a specialized type of piercer. Roth (1898 and 1904) described one used on Big Keppel Island, Queensland. It consists of a piece of white quartz, totally unworked, wedged into the split extremity of the peduncle of the grass-tree stem, the latter forming a shaft or handle about two feet long. When in use the drill was held vertically and twirled between the hands. It is used for drilling coconut and turtle-shells in the manufacture of fish-hooks and for piercing nautilus-shell discs for circlets

and necklets. Dr. T. D. Campbell has a hafted stone drill in his possession which was used by the Dieri tribe of Cooper's Creek, Central Australia. The use of a tooth or bone drill is more widespread than the stone type.

Burins. (Figs. 61–70, 249*c*.)

1943. Burinates and micro-burins, Campbell and Noone, *A*, pp. 294-6, figs. 36-45; *B*, p. 380, figs. 41-51.
Burinates, McCarthy, *A*. pp. 132, 143-4, 149, 151, figs. 96-103; *C*, pp. 201, 207, figs. 9-11, 48; McCarthy and Davidson, pp. 212, 220-1, 226, figs. 61-9; Noone, *A*, p. 277, fig. 18.
1944. Burins, Noone, p. 136, figs. A-B, D.



121 122

Figs. 121-122. *Leilira* blades trimmed on lateral margins and distal ends and used as knives by women. Quartzite. Central Australia.

From Spencer and Gillen (1927, II), figs. 202-3.

Nat. size.

The burin is distinguished by its narrow, specially restricted but stoutly backed working edge, usually formed on the end or ends of a blade. This working edge is formed by opposing one method of trimming, such as the removal of a narrow flake or spall, against the same or another method of trimming, such as scaling or fluting. The classification of Noone (1934) is the most comprehensive one available, and is followed here. Each of his three major types, the spalled, scaled, and fluted, are subdivided in great detail according to technique of manufacture. Noone employs the term spall for narrow flakes struck off in forming the working edge.

On the spalled burin (Figs. 61–62) the platform is formed by a plain spall, and the removal of one or more spalls from its margin forms the plain working edge. On the scaled type (Figs. 63–65) the working edge is scaled, and is formed primarily by the removal of a spall at the end of the platform. In the counter-scaled variety (Figs. 67–69) a scale is removed instead of a spall at the end of the platform, and the working edge is ridge-like. On the fluted type the opposed methods of trimming which form the edge consist of a platform from the edge of which have been knapped a series of long, narrow spall scars; this type has not yet been recorded in Australia.

It was always considered, and stated in some works, that burins did not occur in Australia, but Noone (1943) identified spalled and scaled types in various museum collections, and subsequently McCarthy (1943) described varieties of both types from New South Wales.

Fabricators and trimming-stones. (Figs. 101–102.)

1931. Button flakes, Thorpe, *A*, p. 286, fig. 10.
1935. Button flakes, Towle, p. 120, pl. i, group *c*.
1941. Flake fabricators, McCarthy, *B*, p. 263, fig. 10.
1943. Punches, chisels, battered pieces and trimmers, Campbell and Noone, *A*, p. 297, figs. 46-7; *B*, pp. 382-3, figs. 115, 146-7, 156; Flake Fabricators, McCarthy, *A*, pp. 132, 145-51, figs. 23-4; *C*, pp. 201, 207, figs. 29-30; McCarthy and Davidson, pp. 212, 221, fig. 37.

Fabricators and trimming-stones are flakes or blades with one, and usually both, facets of the working edge battered and splintered from use. The working-edge is frequently gouge-like. The majority are trimmed bifaces, with working edges on one lateral margin or one end, one margin and one end, two opposite lateral margins, two lateral margins and one end, or two lateral margins and both ends; the punch-type (Fig. 102) has a working edge at both ends, and is comparatively thick.

Use-polished edge.

1943. Smoothed edges, McCarthy, *A*, pp. 132, 145; *C*, p. 207.
1946. McCarthy.

Flakes and blades occur on which the working edge is polished and rounded. The edge is produced by use and not by grinding, and it occurs on some trimmed coroids, knapped blocks and slices. It is common among Worimi cleavers.

Points. (Figs. 123–183.)

Analyses of collections of normal flake and blade implements from various localities in Australia have revealed the existence of a number of casual and specialized points throughout the continent. Points are extremely important indications of the identity of industries, and their study throws much light on cultural relationships and local variations of types. They appear to have been used principally as spear barbs and points, but first-hand information in regard to their function in Australia has been recorded for only a few types. Examples of microlithic size are common in all types.

The specialized types are now known by aboriginal and geographical names. They are of two kinds, the symmetrical and asymmetrical, but it should be noted that the *Bondi*, *Woakwine* and *Adelaide* points are trimmed along one lateral margin, the bi-marginal and sometimes the *Paroo* points along both lateral margins, the *Pirri* on one and sometimes on both surfaces, and the biface points on both surfaces.

Asymmetrical points.

Bondi-point (Figs. 123-160).—Referred to as points, unless otherwise stated, in the list of references.

1907. Chipped-back surgical knives, primary flake points, Etheridge and Whitelegge, pp. 230-5, 241, 244, fig. 39, pl. xlii, groups 1-3.
1914. Johnson, pp. 75, 147, figs.; Lancets or points, Kenyon and Mahony, p. 12.
1921. Chipped-back knives, Horne, *A*, pp. 8-9, figs. 19, 22, 24.
1922. Chipped-back knives, Horne, p. 64, fig. 3 (left); Spencer, p. 87.
1924. Chipped-back knife, Horne and Aiston, p. 98.
1927. Doak and Doyle, pp. 33-4, 38; Kenyon, p. 283, pl. xvi.
1928. Scarifiers and chipped-back knives, Thorpe, p. 244.
1930. Towle, p. 10.
1931. Mitchell, pp. 162-3, pl. vi; Rolfe, p. 37; Scarifiers and chipped-back points, Thorpe, *A*, figs. 6 and 8; Lancet points or surgical knives, Turner, *B*, p. 35, fig. v.
1932. Chipped-back knives, Kennedy, K., *A*, pp. 106-9; Miniature spear-barbs, Turner, pp. 110-2; Turner and others, p. 99.
1933. Chipped-back surgical point, Cobb, pp. 163-5.
1934. Scarifiers or points, Kinsela, pp. 204-5; McCarthy, pp. 240-1.
1935. Asymmetrical points, Towle, pp. 117, 119, 131, pl. i, group *a*.
1936. Fürer-Haimendorff, pp. 20, 34.
1939. Moss, p. 163.
1940. Asymmetrical points, McCarthy, *A*, pp. 39-40, 46-7, pl. iv, figs. 1-4.
1941. Sydney point, Tindale, *A*, p. 146.
1943. *Bondi* point, Campbell and Noone, *A*, pp. 293-4, fig. 28; South-eastern *Bondi* point, Campbell and Noone, *B*, pp. 376, 379, 384-5, figs. 20-4, 39; *Bondi* point, McCarthy, *A*, pp. 132-3, 145-9, 151, figs. 37-69, 78-85; *C*, pp. 201-2, 207-9, figs. 41-3, 45; McCarthy and Davidson, pp. 211-2, 221-4, 229, figs. 84-97; Mahony, p. 44; Bondi, Sydney or Eastern point, Noone, *A*, pp. 275, 278, fig. 17.

Figs. 123-174. Points from coast of N. S. Wales, Bathurst and Singleton, N. S. Wales.

Boudi points. 123-135. Partly trimmed points and associated oblique trimmed blades. 136-143. Trimmed along one edge of thick lateral margin. Note serrated thin margin of 139, and the trimming continued round straight butt to end of thin margin on 143. 144-149. Trimmed on two edges of thick margin. Note serrated thin margin of 147. 150-151. Points with oblique distal end. 152. Trimmed along one margin in bracket form. 153. Showing use of thin margin. 154-160. Concaves on butt or lateral margin. 161-167. Bi-marginal points, 168-173, *Woakwine* points, showing variation of marginal and butt trimming. (After Noone.) South Australia. 174. *Paroo* point. Lake Peery, N. S. Wales.

The materials are cherts, jasper and quartzite.

After McCarthy, 1913. 0·6 nat size. N. Adams, del.

The *Bondi*-point is abrupt-trimmed, and according to McCarthy (1943, *A*) it comprises three principal sub-types and a number of varieties, as follow:

i. Trimmed on single edge of distal end, with plain butt.
„ „ „ „ „ and butt.
„ „ „ „ „ with faceted butt.
„ „ „ and whole of margin and butt.

ii. Trimmed on two edges of thick margin on distal end, with plain butt.
„ „ „ „ „ „ „ and butt.
„ „ „ „ „ „ „ with faceted butt.
„ „ „ „ „ and whole of margin and butt.

iii. Bi-marginal, with plain, faceted or trimmed butt:
Trimmed on one edge of thick margin and on thin margin.
Trimmed on both edges of thick margin and on thin margin.

The ideal kinds are characterized by a completely trimmed thick margin, on either one or both edges, and either a trimmed or a faceted butt. In shape the *Bondi*-point ranges from narrow to broad, and its dimensions are up to about 3 cm. wide and 8 cm. long. The name *Bondi* was proposed by McCarthy (1943, *A*), although first used by Campbell and Noone (1943, *A*) as a result of correspondence; it is derived from one of the first localities at which this point was collected, on the coast of New South Wales near Sydney, by Etheridge and Whitelegge, in 1907 and preceding years.

The *Bondi*-point occurs chiefly in the eastern parts of south-east Australia, but has also been recorded in South Australia and Western Australia. It appears to be characteristic of microlithic and related industries.

Woakwine point. (Figs. 168–173.)

1943. Asymmetrical, oblique point, Campbell and Noone, *A*, p. 294, figs. 31-2; *Woakwine* point, Campbell and Noone, *B*, pp. 378-9, 385, figs. 26-36.

The *Woakwine*-point is an asymmetrical trapeze in shape, elongated to a fine oblique point, abrupt-trimmed on the oblique margin of the distal end. There are one or more ridges on the outer face. It is usually made from a comparatively thin bladelet, trapezoid in transverse section, which is altered to a marked triangular section at the distal end. The trimming seldom extends beyond this oblique portion of the margin, although a few specimens show trimming along the full length. The butt is frequently trimmed to shape, and the base to a (i) straight, (ii) rounded, (iii) short oblique, or (iv) slightly incurved outline. In size this point is up to 5 cm. long, and is frequently more than 3 cm. The name is derived from the locality, in south-east South Australia, from which the type was described by Campbell and Noone.

There is a close relationship between the partly trimmed *Bondi*-points and the *Woakwine*-point, and it is possible that the latter is only a South Australian variety of the former.

Symmetrical uniface points.

Pirri-point (Fig. 175).—Referred to as *Pirri*, unless otherwise stated, in the list of references.

1904. Acicular scraper, Roth, sect. 26, figs. 86, 86*a*.
1924. Horne and Aiston, pp. 90-1, 108-9, fig. 67.
1929. Aiston, pp. 124-5, 127-8, pls. xxv, xxvii, no. 50.
1930. Leaf-shaped points or *pirries*, Hale and Tindale, pp. 194-5, 198-9, 204-5, figs. 176-89, 230-41.
1934. *Pirries* or gravers, Howchin, pp. 63-7, 77, figs. 110-20, 140-2; Mitchell, p. 256.
1935. *Pirrioid*-type adze-point, Davidson, pp. 152, 160, 167, 180, figs. 6-10; Symmetrical points, Towle, p. 121, pl. iv, *e*.
1936. Fürer-Haimendorff, pp. 17-8, 20, 36, 433, 435, 443, 452, figs. 13.
1937. Tindale, pp. 53-60.
1938. McCarthy, p. 40.
1940. Casey, pp. 27, 39-40, 46-7, pl. vi, fig. 2; McCarthy, *B*, p. 309.
1941. McCarthy, *B*, p. 261, figs. 7-8; Mountford, p. 316; Tindale, *A*, p. 146; Tindale and Noone, p. 120.

1943. South Australian *pirri*, Campbell and Noone, *A*, pp. 287-91, figs. 1-17; *B*, p. 384; Untrimmed leaf-shaped point, Campbell and Noone, *A*, p. 293, figs. 24-37; *B*, p. 378, fig. 25; Cooper, *A*, p. 349; Noone, *A*, pp. 275, 278; Towle, p. 73.
1944. Noone, p. 136.

The *Pirri*-point is leaf-shaped, keeled, with its outer face, which is convex, either partly or wholly trimmed; the trimming extends from both margins to the keel. The striking-platform is often removed by trimming the butt to an edge, otherwise the platform is plain. The cleavage face is plain on the majority of specimens, but rare

Figure 175. South Australian Points.

Nos. 1-10. Typical South Australian *pirri*; No. 5 is small and narrow, 6-7 are squat, 8 is triangular, 9 is long and narrow, and 10 is large. 11. Fulham *pirri*. 12-13. Biface worked *pirri*. 14-16. *Pirri* trimmed on one margin. 17. Unfinished *pirri*. 18. *Pirri* nibble-trimmed on point. 19. Abrupt-trimmed long *pirri*. 20. Adelaide abrupt-trimmed point.

After Campbell and Noone, 1943A, p. 290.

Nat. size. G. Walsh, del.

examples are semi-bifaces with trimming across the bulb of percussion. The trimming on the *pirri* is regular and of the pressure kind, and the neat parallel or channel-like working is similar to that on the Kimberley biface points. The *pirri* is up to about 8 cm. long. It is widely distributed in the interior of the continent, and it occurs also in the Kimberleys of Western Australia. Campbell and Noone (1943, *A*) differentiated the following three varieties among the South Australian *pirri*:

i. Typical (Fig. 175, Nos. 1–10).

ii. Fulham-type, with high mid-ridge, thin convex butt, and usually small (Fig. 175, No. 11).

iii. Trimmed on one margin, with long, low-angled flake-scars, and butt usually untrimmed. It is symmetrical in general outline (Fig. 175, Nos. 14–15).

The Pirrian industry in the Devon Downs cave (Hale and Tindale, 1930) derives its name from the large number of *Pirri*-points found in this section of the deposit (*see* Addenda).

Adelaide-point. (Fig. 175, No. 20.)

1934. Single-edged flakes, *B*, Chipped-back knives, Howchin, pp. 29-30, figs. 13-22.
1943. *Adelaide*-type, Campbell and Noone, *A*, pp. 292-3, figs. 19-20; *B*, p. 384; *Adelaide* abrupt trimmed point, Noone, *A*, p. 275.

The *Adelaide*-point is leaf-shaped, usually symmetrical in outline, with abrupt trimming along one margin, usually a thick margin. It is a South Australian point of the *pirri* type but is trimmed on one side only.

Bi-marginal point. (Figs. 161–167.)

1935. Davidson, fig. 7.
1943. Bi-marginal point, Campbell and Noone, *A*, p. 293, figs. 21-2; *Bondi*-points trimmed on two margins, McCarthy, *A*, p. 148, figs. 64-9; Symmetrical point, McCarthy and Davidson, pp. 223, 227, fig. 98.

Bi-marginal points are distinguished by trimming along both lateral margins. They have been recorded in low numbers among the *Bondi*-points of New South Wales, among other points, including the *pirri*, in South Australia, in the Kimberleys of Western Australia, and western New South Wales.

Paroo-point (Fig. 174).—A large point with a notably broad butt end. It is trimmed along one or both lateral margins. The striking-platform is plain and may not be central, but may be situated on one side at the end of a lateral margin. The Australian Museum possesses one 6 cm. long and 4·25 cm. wide from the Paroo River, western New South Wales, and one 4 cm. long and 3 cm. wide from Attunga, New South Wales. This point has sometimes been referred to as a pointed side-scraper, but its general form and characteristics merit its inclusion among the points. The name is derived from the above river, and is proposed for the type.

Symmetrical biface points. (Figs. 118, 176–178.)

1891. Spear-head, Etheridge, p. 36, pl. iv, fig. 1.
1901. Spear-heads, Spencer, pp. 74, 80.
1904. Andesite spearheads, Roth, sect. 24.
1914. Spearhead, Spencer, p. 357.
1928. Slate spearhead, Spencer, vol. II, pp. 510-1, fig. 375.
1938. Kimberley points, McCarthy, p. 40.
1940. Round-butted point worked on both surfaces, McCarthy, *A*, pp. 39-40, 46-7, pl. v, figs. 2-3; Kimberley spearpoint, McCarthy, *B*, p. 309.

There are two principal types of symmetrical biface points. The Kimberley type (Figs. 176–178) is comparatively short and broad, ranging up to 10 cm. long and 4 cm. wide. Both surfaces are usually completely, but sometimes only marginally, worked. The trimming may be neat channelling similar to that of the serrated point in this area, but is frequently irregular with an uneven distribution of the flake-scars. The type is limited in distribution to the Kimberleys and to an undefined area extending to the westward, southward and eastward of this district. Although it is apparently a stage in the making of the serrated point, it is also used separately as a spearhead and therefore merits distinction as a type. It is probable, too, that the serrated edge was an addition in prehistoric times to the plain edge on Kimberley points (McCarthy, 1940, *A*, pp. 39, 47; *B*, p. 309).

The *Wa:nji* biface point (Fig. 118) is elongate and slender, ranging up to 20 cm. long and 4 cm. wide. Both surfaces are trimmed marginally, and there is frequently a long flake-scar, extending from butt to point down the middle of one surface. The lateral margins are crescentic. The butt is a straight or oblique face, there being no obvious bulb of percussion or striking-platform on specimens made of slate which has flat cleavage planes. The *wa:nji* point occurs in the Northern Territory, including Arnhem Land, and in north-west Queensland. The name proposed is that of the Wa:nji tribe, whose territory extends from the Northern Territory into north-western Queensland; Roth collected specimens in the latter area.

Kimberley serrated biface point. (Figs. 120, 179–183.)

1890. Spearhead, Edge-Partington and Heape, vol. I, pl. 364, fig. 3.
1891. Spearhead, Etheridge, pp. 34-7, pls. v, fig. 2, vi, 2, vii, 2-3, viii, 2-3.
1897. Spearhead, Worsnop, pp. 114, 124, pl. 57, figs. 4-6, pl. 61.
1901. Serrated spearhead, Kenyon and Stirling, p. 194 and table, pl. xxxiii, figs. 4-8; Spencer, pp. 75, 80, fig. 157.
1903. Spear-head, Clement, pp. 4-5, pl. iii, figs. 15, 18, 20.
1914. Serrated spearhead, Kenyon and Mahony, pp. 6-7; Spencer, p. 357.
1915. Kimberley spear-heads, Breton, p. 25.
1916. Serrated spearheads, Glauert, p. 44.
1917. Spearheads, Love, pp. 25-6, figs. 5-7.
1921. Solutrian spearhead, Horne, *A*, p. 15, fig. 58*a*.
1922. Serrated spearheads, Spencer, pp. 79-81, 37, fig. 164.
1925. Serrated spear-points, Basedow, *B*, pp. 367-70.
1928. Leaf and lanceolate-shaped flakes, Spencer, vol. II, pp. 510-1, figs. 377-8.
1934. Serrated spear-points, Turner, *A*, p. 228; Stone-pointed spears, Davidson, p. 152, figs. 29-30; Serrated spearheads, *Anonymous*, p. 170.
1935. Kimberley spearheads, Davidson, pp. 168-80, fig. 11, map; Serrated spearhead, Towle, pp. 139-40.
1936. Spitzen, Fürer-Haimendorff, pp. 30, 33; Spearheads, Love, pp. 74-6, 2 pls; Kimberley spear-heads, McCarthy, *B*, p. 13.
1937. North-west Australian spearheads, Tindale, p. 57.
1938. Spearheads, Davidson, *B*, pp. 66, 69; Kimberley points, serrated, McCarthy, p. 40.
1940. Kimberley spearpoint, McCarthy, *A*, pp. 39-40, 46-7, pl. vi; *B*, pp. 309, 311.
1941. Points chipped on both surfaces, McCarthy, pp. 261-2, figures.
1943. Spearheads, Noone, *A*, p. 273, 283, 289-91, figs. 3-9.
1944. Points, Noone, pp. 136, 138.

Examples of the Kimberley biface serrated point vary considerably in workmanship. The ideal type has a rounded thin-edged butt and a pointed distal end. The upper and lower surfaces are rounded, although on a few examples a slight ridge is apparent. The trimming displays narrow and parallel flake-scars, or channelling, which usually extends from each margin to a sinuous meeting line in approximately the middle of each surface. The point is skilfully worked. There are numerous intermediary and poorly made varieties. Some of the serrated points are worked on one surface only (like the *pirri*-point), others are semi-biface. The treatment of the margins varies from edges which are finely and uniformly toothed to those with broad projections, and the spacing of the latter is variable; the work is frequently coarse towards the butt and more finely done towards the point. In size this point ranges up to 10 cm. long and 3 cm. wide.

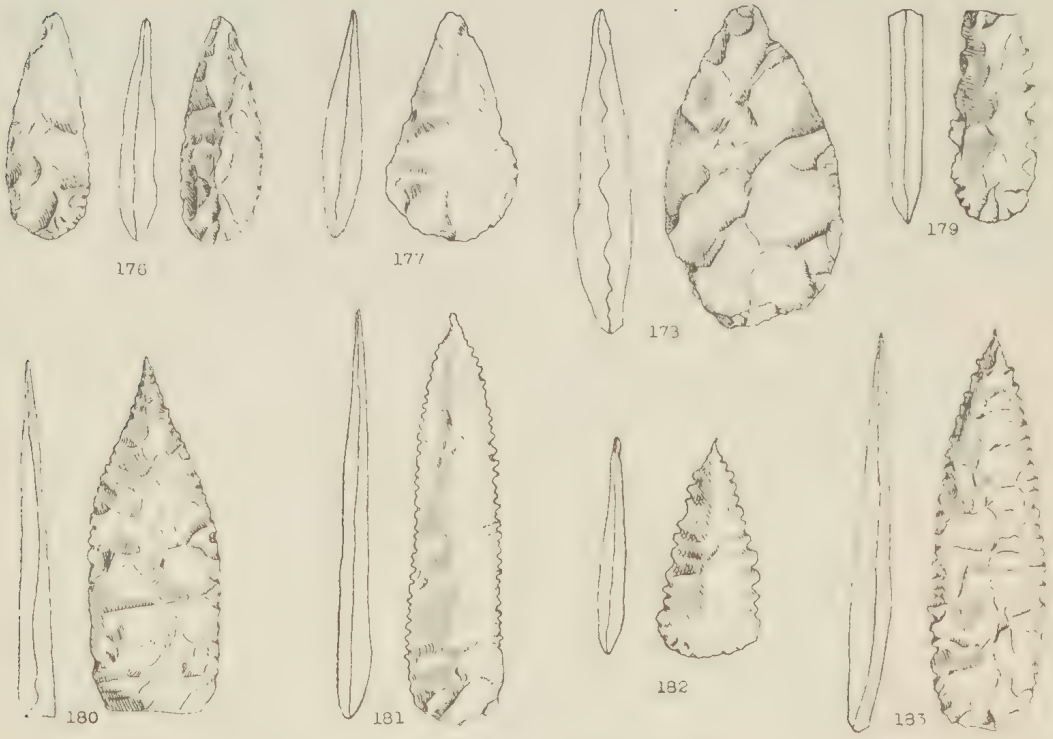
It is interesting to note that the technique as a whole appears to have been developed to an extraordinarily high degree since white settlement in the area, because of the great demand for these points as curios; this impulse has produced a refinement in the shape, treatment of margins, and surface trimming, especially in European glass and insulator materials.

As the name indicates, the distribution of this point is centred mainly in the Kimberleys of north-western Australia, but it is traded widely to the west, south and east. Noone (1943, *A*) subdivided the Kimberley biface serrated points as follows:

i. Dentated, of squat, narrow or miniature form.
ii. Serrated and lanceolate, of coarse, bay-leaf, narrow or squat form.

The type merits a detailed analysis of the old and modern forms to differentiate the varieties. The range of leaf-shapes is wide and they are usually beautifully made.

Untrimmed points. The casual use of untrimmed points probably took place, but only actual specimens whose use is verified can be accepted.



Figures 176-183. Kimberley Points.

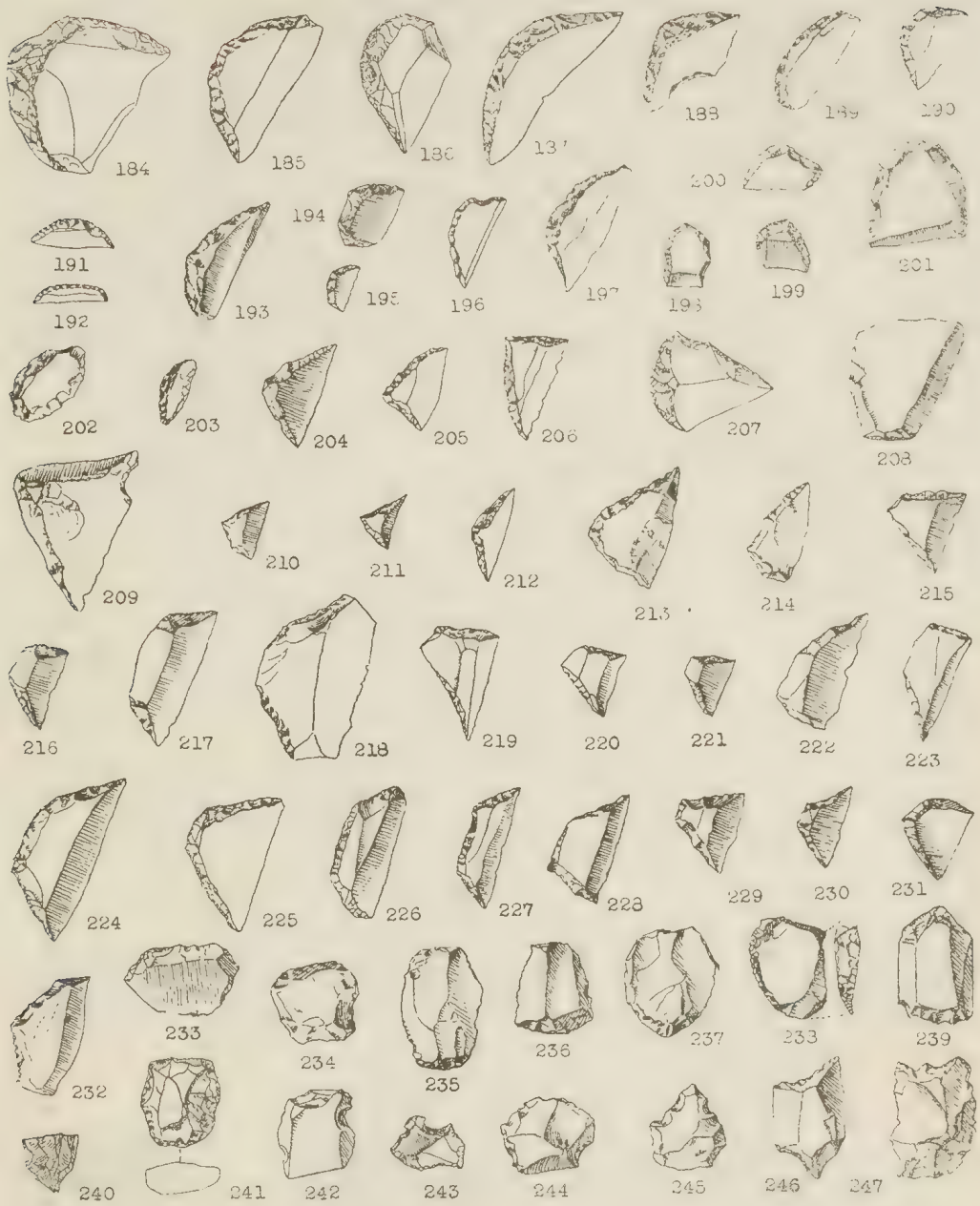
176. Biface point, partly worked on inner face. 177 178. Biface points. 179-183. Serrated biface points showing variation of marginal serrations. The materials are quartzites and chalcedony.

0·5 nat. size. N. Adams, del.

Microliths. (Figs. 184-247.)

Referred to as microliths or pigmy implements, unless otherwise stated, in the list of references.

1914. Johnson, p. 75, figure; Kenyon and Mahony, pp. 6 and 12.
1916. Glauert, p. 44.
1921. Chipped-back knives and thumbnail scrapers, Horne, *A*, pp. 9, 14-5, figs. 20-3, 25-6; *B*, pp. 52, 83-6.
1922. Chipped-back knives and thumbnail scrapers, Horne, pp. 63-5, figs. 14-5; Pigmy implements, Spencer, p. 87.
1924. Chipped-back knife and semi-circular knives, Horne and Aiston, p. 98, fig. 73.
1925. Spencer, p. 33.
1926. Kenyon and Mahony, *B*, p. 466.
1927. Points, Doak and Doyle, p. 34; Chipped-back implements, Kenyon, pp. 282-3, pl. xvi.
1930. Microliths and thumbnail scrapers, Hale and Tindale, p. 189, Pirrian, Mudukian.
1931. Crescent, Rolfe, p. 61; Thumbnail scrapers, Thorpe, *A*, figure; Crescents, points, scrapers and gouges, Mitchell, pp. 162-3, pls. vi-vii; Chipped-back crescents, Thorpe, *D*, p. 50; Chipped-back knives, Turner, *B*, p. 31, fig. iii.
1932. Crescents, Kennedy, K., *A*, pp. 106-9; Turner, pp. 110-2.
1933. Crescents, Cobb, pp. 163-5.
1934. Howchin, pp. 71-7, figs. 132-46; Kinsela, pp. 204-5; Crescents and thumbnail scrapers, Mitchell, p. 256.
1935. Crescents and small scrapers, Towle, pp. 121, 131, pl. iv, *f-g*.
1937. Crescents and small chipped-back knives, Tindale, p. 54.
1938. McCarthy, pp. 39-40.
1939. Croll, pp. 13-4, fig. 2; Walker, p. 28, fig. 1.
1940. McCarthy, *A*, pp. 28-30, 33, 38-9, 46, pl. iv, fig. 5; *B*, p. 255.



Figures 184-247. Microliths from coast of N. S. Wales, Singleton and Bathurst, N. S. Wales, and Victoria.

184-203. Rounded segments. Note the concave on the thin margin of 188, and on the thick margin of 196, the oblique trimmed ends on 200-201, the hat-like shape of 198-199, and the thin-margin trimming on 202-203 (from Inverleigh and Ral Ral, Victoria). 204-214. Triangles. Note the concave on the thin margin of 209, the bracket form of 206, 210, and 212, and the oblique trimmed end of 208. 215-223. Trapezes, with untrimmed short lateral margin. 224-231. Trapezes, with trimmed short lateral margin. 232. Bracket. 233. Abrupt-trimmed blade. 234. Concave. 235-237. End scrapers, note duckbill, 236, and thumbnail, 237. 238. Double side and end trimmed. 239. Double end trimmed. 240. Conical nucleus. 241. Double side and end trimmed, crowned. 242-247. Special pieces of miscellaneous shapes. The materials are cherts, jasper, quartzite, quartzose rock.

After McCarthy, 1943. 0·7 nat. size. N. Adams del.

1941. McCarthy, *B*, p. 260, figs.; Mitchell, pp. 372-3; Mountford, p. 316; Microlithic adze-stones, Tindale, *A*, p. 146.
1943. Campbell and Noone, *A*, pp. 294-303, figs. 33-69, 76-108, 114-7; *B*, pp. 375, 378, 382, 384-5, 387, figs. 102-4, 116-40; McCarthy, *A*, pp. 133, 149-51, figs. 70-7, 79-84, 86-95; *C*, pp. 201, 209, figs. 37-39; McCarthy and Davidson, pp. 211-2, 225-6, 229, figs. 99-135; Mahony, p. 44; Noone, *A*, pp. 271-80, figs. 3, 6, 15-17; Crescents, Towle, p. 73.
1944. Noone, pp. 136, 138.
1945. Mounted stone engraver, Tindale, pp. 83-84, pl. iii.

Although the microliths are generally limited to 3 cm., or three-quarters of an inch, in length, it should be noted that some of the rounded and angular examples exceed this measurement. Many implements of microlithic size are of the same form and workmanship as the large implements in the trimmed coroid group, and among the knapped blocks and the normal flakes and blades, but as the classification given for those groups is applicable to the microlithic-size implements of the same kinds, it is not repeated here. Campbell and Noone have described and illustrated (1943, *A*) a representative series of these microliths from South Australia, and their occurrence appears to be widespread in Australia generally. There are, in addition, such types as the thumbnail scrapers and trimmed bladelets.

Tindale (1945) has described a microlithic mounted engraver (Fig. 248) from Birdsville, western Queensland. The adze-flake is an angular microlith of the equilateral triangle type, set in gum on the end of a round wooden handle. As Tindale points out, the geometrical microliths were only known archaeologically in the past, and this hafted example is an important guide to their use by modern aborigines.

Geometrical: The geometrical microliths form a distinctive and important series of implements which are widely distributed in Australia. The majority are unworked on the chord or thin margin, but examples retouched and often heavily used on this margin are of frequent occurrence in some localities. The geometrical microliths comprise the following types:

Rounded microliths (Figs. 184-203).—Segments of various shapes, including the crescent (the thin margin of which is always incurved), cocked, lunate, semicircular, hat, rudder and other varieties. The bracketed segment has a pointed projection in the middle of the trimmed margin. Segments also comprise narrow, medium and broad kinds.

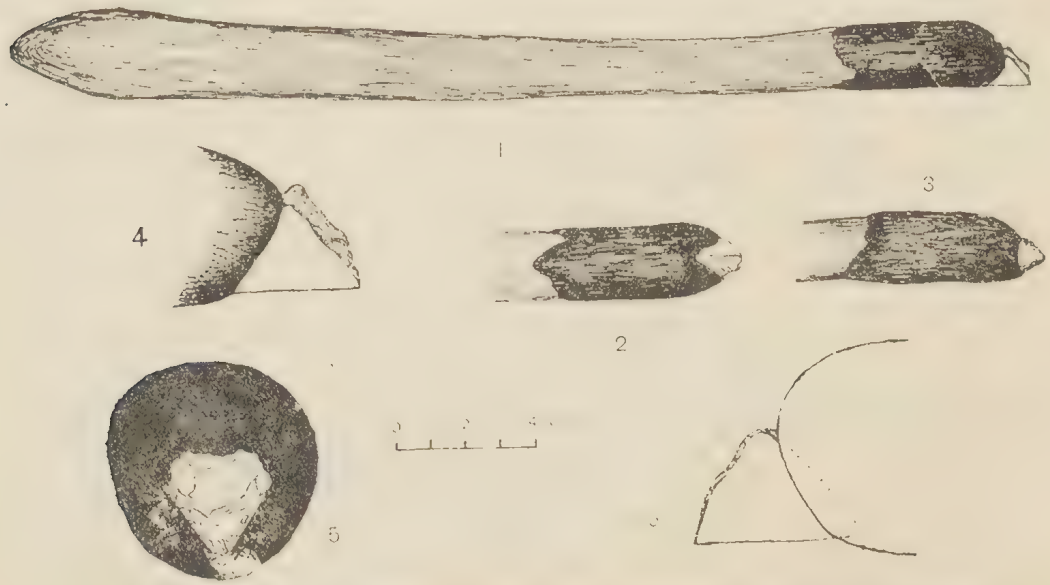


Fig. 248. Microlith, of equilateral triangle type, hafted for use as an engraving tool. Birdsville, Western Queensland.
From Tindale, 1945, Plate iii.

Angular microliths.—This type comprises the triangles and trapezes. The triangular microliths (Figs. 204–214) recorded comprise the equilateral, obtuse, isosceles, scalene, and bracket forms. The trapezoid microliths (Figs. 215-231) recorded consist of the symmetrical and asymmetrical forms on which the short margin opposite the thin margin may be trimmed or untrimmed. The angular microliths range from narrow to broad, and from short to long, in shape. Some varieties have concave ends, which are trimmed.

There are, in addition, sundry microliths of unusual shapes (Figs. 242–247) which do not fit into the above classification, and they are not specialized types. A number of them have been figured by Campbell and Noone (1943, *A*), McCarthy (1943, *A-B*), and McCarthy and Davidson (1943).

Stigmate-Burin. (Figs. 66, 249, *A–B, D.*)

1943. Micro burins, Campbell and Noone, *A*, pp. 294-5, figs. 36-41; McCarthy and Davidson, p. 226, fig. 66.

1944. Micro-burin, Noone, p. 137, figs. A-B, D.

This piece, designated sometimes as a micro-burin, bears a distinctive bulb-scar called the stigmate on the edge of the cleavage face, and the outer face is a trimmed concave in shape. The stigmate is formed by the removal of an oblique and narrow scale from the inner face. The type is extremely rare in Australia.

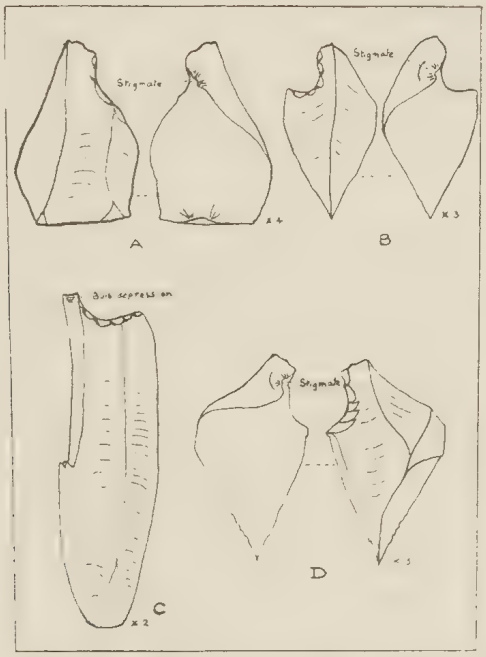


Fig. 249. *Burins.* A. Tardenoisian stigmate-burin made on butt end of bladelet, and B, made on tip of bladelet. C. Ordinary burin with single spall opposed to concave scaled edge. D. Stigmate-burin from Lyndhurst, South Australia.
After Noone, 1943B, p. 139.

Untrimmed microliths.—Thin, irregular flakes of microlithic size which were mounted in gum-cement to form the teeth of the saw-knife, and the barbs of the death-spear.

Saw-knife. (Fig. 326.)

1827. *Taap*, King, vol. II, pp. 139-40, figure.
1872. Knife, Evans, p. 264.
1878. Meat-cutter or knife, Smyth, vol. I, fig. 151.
1890. Quartz-chip knives, Edge-Partington and Heape, I, pl. 341.
1897. Knife, Worsnop, p. 113, pl. 56, fig. 1.
1901. Hafted multiple flake knife, Kenyon and Stirling, p. 194 and table, pl. xxvi, fig. 3; *Dabba* or *Tabba*, Spencer, pp. 71, 79, fig. 149.

1914. Knife or saw, Kenyon and Mahony, p. 6.
1922. *Dabba* or *Tabba*, Spencer, pp. 74, 80.
1925. Knife, Basedow, *B*, p. 367.
1927. Saw-knife, Kenyon, p. 285.
1943. Quartz-chip saw-knife, Noone, *A*, pp. 275-6, 279-80.

So far as is known, the flakes are not trimmed, nor are they set in a groove. Most of them are made of quartz chippings. The implement is limited to south-western Australia in distribution, although a similar saw-knife with sharks' teeth instead of stone chips occurs in Queensland.

Death-spear barbs. Referred to as death-spear, unless otherwise stated, in the list of references.

1872. Spears, Evans, p. 264.
1901. Spearheads, multiple flakes, Kenyon and Stirling, p. 194; Multiple stone-headed spears, Spencer, pp. 80, 88.
1903. Roth, pp. 58, 67-8.
1907. Flakes for barbing spears, Etheridge and Whitelegge, pp. 244-8, pl. xliv, group 2, figs. 42-43.
1908. Eylmann, p. 327, pl. xviii, fig. 4.
1914. Spearhead, Kenyon and Mahony, p. 7.
1925. Basedow, *B*, p. 367.
1932. Turner, pp. 110-2.
1933. Hammond, p. 33.
1934. Davidson, p. 49; Howchin, p. 82.
1936. Fürer-Haimendorff, pp. 20, 22, 36, fig. 35; spicules, McCarthy, *B*, pp. 13-4.
1937. Spicules, Davidson, p. 62; McCarthy, p. 71.
1943. Campbell and Noone, pp. 299-300; Noone, *A*, pp. 275-6, 279-80.

So far as is known, the flakes are not trimmed, nor are they set in a groove. They are made of many kinds of stone, including quartz. The death-spear had a wide distribution in Australia (Davidson, 1934).

EDGE-GROUND IMPLEMENTS.

The major sub-groups of edge-ground implements are the axe-heads, adze-heads, scraper-knives, chisels, and alien forms. It should be noted that some cylindro-conical stones, and some *yodda* and *mena* tanged implements, in the ritual group, have edge-ground blades.

In the classification of the above sub-groups the shaping process is utilized as the primary criterion, with a further subdivision according to transverse section. The rounded and lenticular transverse sections are predominant in most of the sub-groups, but the rectangular section occurs in a minority and may be said to be rare. While most edge-ground implements are coroids, others are made from knapped pieces. It is difficult to define sharply the edge-ground and semi-ground or polished axe-heads and adze-heads because on some specimens the grinding of the blade-end extends as far as the middle of the implement, and the line of demarcation is therefore of an arbitrary nature. The difference between ground and polished, as given in the glossary, should be noted, because each term has a special usage. For these reasons, the classification adopted includes the edge-ground, semi-ground or polished, and the fully ground or polished implements should any or all of them occur in any one type. Fully polished examples are comparatively rare in Australia. The grinding and polishing are frequently done on a previously pecked surface, and the pecking on a cortical or trimmed surface, but on brittle materials the grinding or polishing is usually done over the flaking. Another point of interest is that the large, flattish axe-heads have been called wedges by many writers, because of their shape, and this remark applies particularly to the grooved kinds; it is probable that they served such a purpose but they had in addition many other uses. Many axe-heads and adze-heads show signs of battering and percussion on their lateral margins, on the butt, and on the upper and lower surfaces; the butt end especially exhibits frequent use as a hammerstone, and on the surfaces percussive pits due to anvil use are frequently observed on these implements. It is probable that more axe-heads have been collected in Australia than any other type of large implement, but comparatively little descriptive work has been published on them, or on the edge-ground group as a whole.

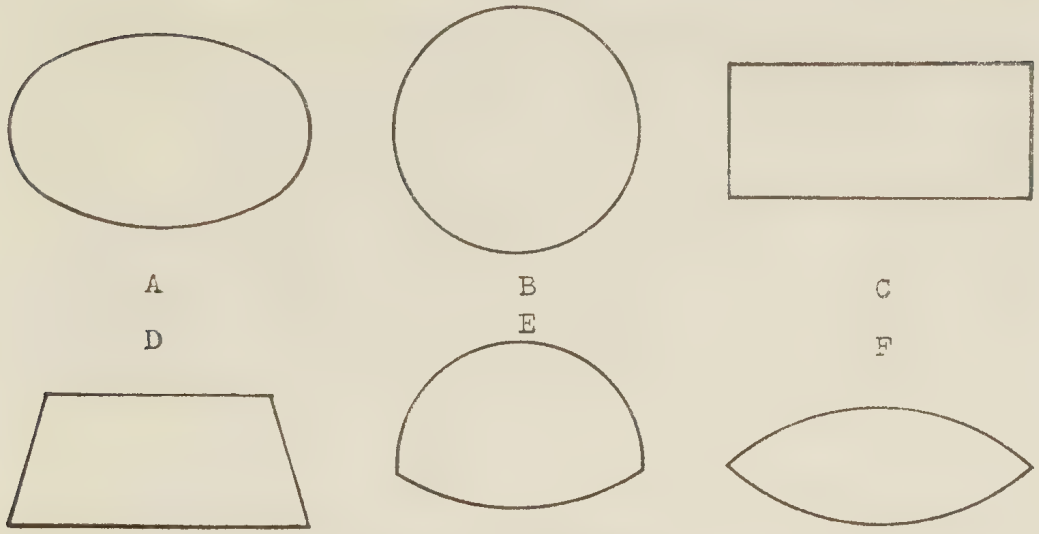


Fig. 250. Transverse Sections.

A-B. Oval and cylindrical, both within range of "round" section. C. Lenticular. D. Rectangular. E. Hog-back. F. Trapezoid.

G. Binsted del.

AXE-HEADS. (Figs. 250–283, 328.)

Referred to as axes, tomahawks or hatchets by all authors in the list of references.

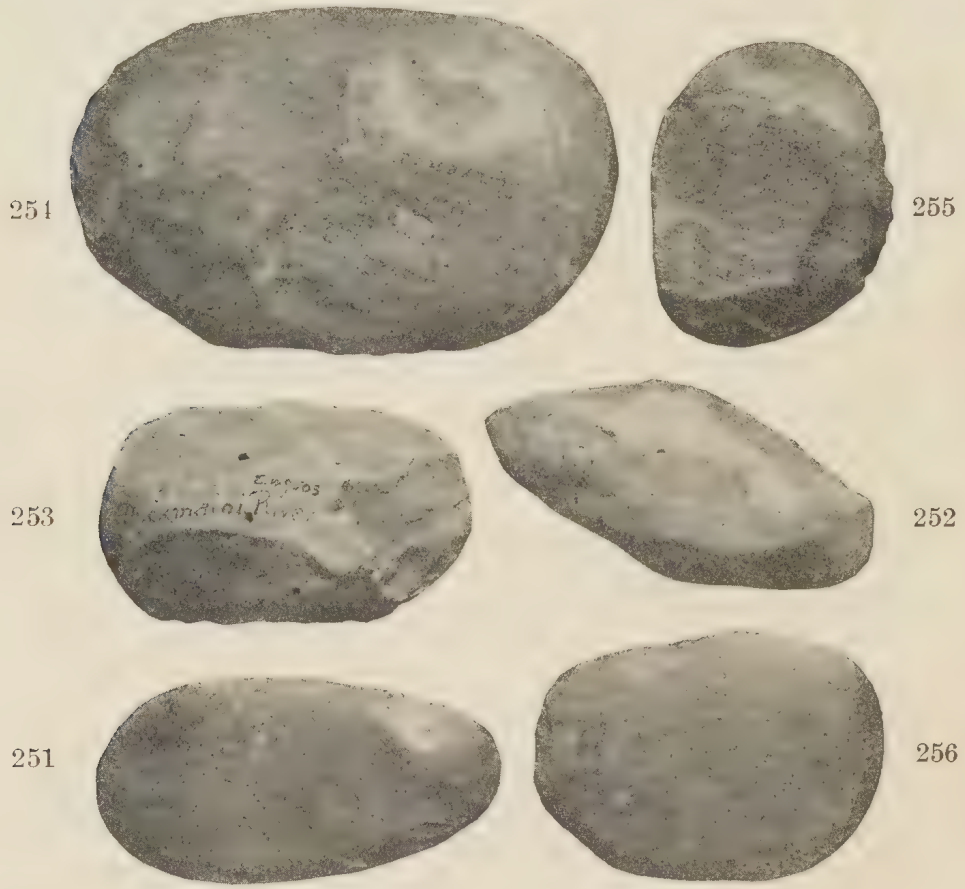
1877. Cox, pp. 21-5.
1878. Smyth, vol. I, pp. 359-79, figs. 175-97.
1886. Macpherson, pp. 113-9, figs. 1, 4-5.
1890. Edge-Partington and Heape, vol. I, pl. 348, nos. 1 and 3, pl. 354, no. 10; Etheridge, pp. 292-3, 369-70, pl. xiv.
1891. Etheridge, pp. 358-72, pls. xxix-xxxi, xxxiii.
1893. Etheridge, pp. 295-8, pls. xi-xii; Thomson, p. 28.
1894. Ferguson, pp. 87-90; Tylor, pp. 335-40, pl. xvii, nos. 1-3.
1895. Liversidge, pp. 234-8, nos. 1-28; Mathews, pp. 303-4, pl. xliii, fig. 1.
1896. Etheridge, David and Grimshaw, pp. 158-85.
1897. Worsnop, pp. 109-10, pls. 51, 61.
1898. Edge-Partington and Heape, vol. III, pl. 130, no. 9, pl. 141, nos. 1, 4-5, 9-13, pl. 143, nos. 1-3, 6-7.
1899. Spencer and Gillen, pp. 588, 590.
1901. Kenyon and Stirling, pp. 195 and table (axes and wedges), pls. xxviii-xxxiii; Spencer, pp. 76, 80-2, fig. 159.
1904. Petrie, pp. 75-76, 104-5, 100, 102; Roth, Sects. 25 and 258, pls. ix-x, figs. 58-70 and 391; Spencer, pp. 354-5, pl. xii, figs. 1-2.
1908. Eylmann, p. 367, pl. xxiii, figs. 6-7.
1909. Daley, pp. 498-502.
1914. Kenyon and Mahony, pp. 7-9, 11, 14-5; Spencer, *B*, pp. 76-7, fig. 25.
1915. Breton, p. 25.
1916. Dick, pp. 282-8; Glauert, p. 44.
1921. Horne, *A*, pp. 11-2, figs. 41-49; *B*, pp. 49, 51.
1922. Spencer, pp. 75-6, 83-6, pl. xv, figs. 157-8.
1923. Enright, pp. 269-70; MacGillivray, p. 69.
1924. Horne and Aiston, pp. 99, 102, fig. 75; Kenyon, Mahony and Mann, p. 470.
1925. Basedow, *B*, pp. 362-3; Pescott, pp. 122-4; Spencer, p. 32.
1927. Doak and Doyle, pp. 32, 38; Kenyon, pp. 284-5; Spencer and Gillen, vol. II, pp. 536, 548.
1928. Thorpe, p. 246; Thorpe and Stanley, p. 211, plate.
1929. Aiston, p. 130.
1931. Mitchell, p. 162; Stanley, p. 50.
1932. Thorpe, *B*, pp. 304-6, pls. xxvii, fig. 6; xxviii, 6; xxix, 1-2, 4, 6-8; xxx, 1, 3-5; xxxi, 1-4, 7.
1933. Ward and Others, p. 1272.
1934. Anonymous, p. 171; Campbell, p. 29; Hale and Tindale, pp. 130, 132; Kinsela, pp. 204-5.
1935. Davidson, p. 154, figs. 2-3.
1936. Fürer-Haimendorff (Beile), pp. 7, 10, 19-20, 23, 25-6, 28-9, 31-2, 436, 439-41, 449, 453, figs. 31-2, pl. II, fig. 17, iii, 19, nos. 1, 3, iv, 20, figures 17, 25-6; Thomson, pp. 71-2, 74, pl. viii, figs. 3-4.

1938. Davidson, *A*, pp. 38-42, map; McCarthy, *A*, p. 40.
1939. Moss, pp. 163-5.
1940. McCarthy, *A*, pp. 40-3, pl. vii, figs. 1-4; *B*, pp. 249, 262, 268, 294, 304, 312, pl. Z, figs. 1-7; *C*, pp. 223-8, figures; Tindale, *A*, p. 146.
1941. Tindale, *C*, pp. 70-1.
1943. McCarthy and Davidson, pp. 228-9; Mahony, pp. 40-1, 43; Noone, *A*, pp. 272-3, 279, figs. 28-9.
1944. Noone, p. 136.

Generally speaking, axe-heads range from about 5 to 30 cm. in length. The universal method of hafting (Fig. 328) consists of a bent cane, or a narrow strip of bark and wood cut from a sapling, branch, or vine, fitted round the axe-head and frequently set in gum-cement; the two projecting ends forming the grip are bound together. In some localities axe-heads were always hafted, and were used principally for cutting out bees' nests (Tindale, 1941, *C*), but in other areas they were used in the hand, served as wedges, and were employed for adzing and cutting when hafted (Roth, 1904, sect. 25). Details of the various types are given below.

Uniface pebble or Windang axe. (Figs. 251–256, 259.)

1889. Axe, David and Etheridge, *B*, p. 144, pl. xx, fig. 4.
1904. Axe, Spencer, p. 355, pl. xii, fig. 3.
1914. Transition-type axes, Kenyon and Mahony, p. 11.
1921. Pebble axes, Horne, *A*, pp. 10-1, figs. 38-42, 49.



Figs. 251-256. Edge-ground Axes of Windang-type, N. S. Wales.

Showing variation of trimming and grinding. 251. Shellharbour. 252. With pointed ground end. Lake Macquarie. 253. Duckmaloi River. 254. Clarence River. 255. Showing negative bulb on a split-pebble slice. North Cronulla. 256. Showing plain cortex outer surface. Louth Plains. After McCarthy, 1944, Pl. xvi, figs. 1-6.

0·3 nat. size. G. C. Clutton, photo.

1928. Improvised pebble axe, ground, Thorpe, p. 210.
1932. Ground-edge pebble axe, Thorpe, *B*, p. 307, pl. xxvii, fig. 2.
1940. Ground-edge *sumatras*, McCarthy, p. 224.
1941. Ground-edge axes, McCarthy, *E*, pp. 24-5.
1944. Windang-axe, McCarthy, pp. 260-3, pl. xvi, figs. 1-6.

The *Windang* axe-head is either a pebble or a split-pebble slice trimmed partly or wholly on one surface; it bears one, occasionally two, working edges ground on one or both facets, on one or on both ends. The type corresponds exactly in form and manner of preparation with the trimmed coroid uniface pebble implements and the split-pebble slices, and for this reason is classified in the same way, that is, according to the extent of trimming. The varieties thus comprise semi-unifaces trimmed at one end, or at one end and one or both lateral margins, the uniface trimmed all over one surface, and the split-pebble slices. The name *Windang* is that of a place on the south coast of New South Wales where these axe-heads have been found in comparative abundance on two kitchen-middens at the entrance to Lake Illawarra. McCarthy (1944) has given a general description of the type.

Pebble axe-head. (Figs. 257–258.)

1877. Cox, pp. 22, 25.
1878. Smyth, vol. I, pp. 359-78, figs. 177-8, 184-6.
1886. Macpherson, pp. 115-6.
1889. David and Etheridge, *B*, p. 144, pl. xx, fig. 4; Etheridge, pp. 292-3.
1891. Etheridge, pp. 358-66, 373, pls. xxix-xxx.
1894. Mitchell, p. 537.
1895. Liversidge, pp. 234-8, nos. 3, 5-6, 8-10, 12, 19, 23, pls. xiii-xiv, xvi-xx; Mathews, p. 303.
1897. Roth, p. 19, figs. 65-8; Worsnop, p. 109, pl. 51.
1898. Edge-Partington and Heape, Vol. III, pl. 141, no. 1.
1901. Kenyon and Stirling, p. 195 and table, pl. xxviii, fig. 1.
1904. Petrie, pp. 104-5 and ch. xiii; Spencer, pp. 354-6, pl. xii, figs. 1-2.
1909. Daley, pp. 498-502.
1914. Kenyon and Mahony, pp. 7, 11; Spencer, *B*, pp. 76-7, fig. 25.
1921. Horne, *A*, p. 11, fig. 48.
1922. Spencer, pp. 75-6, 83-6.
1925. Basedow, *B*, pp. 362-3; Pescott, pp. 122-4; Spencer, p. 32.
1932. Thorpe, *B*, pp. 302-3, 305-6, pl. xxix, figs. 7-8, xxx, 3-4, xxxi, 2.
1933. Cobb, pp. 163-5.
1934. McCarthy, pp. 240-1.
1938. McCarthy, p. 39.
1940. McCarthy, *A*, pp. 27-9, 34, 36; *B*, p. 249, pl. Z, fig. 1; *C*, p. 224, figure; Mahony, pp. 42-3.
1944. Dunbar, p. 148.

There are two kinds of edge-ground pebble axe-heads, the plain (Fig. 257) and the semi-biface (Fig. 258). The latter variety is trimmed along one or both lateral margins and frequently on the butt, principally for shaping but also for producing working edges.

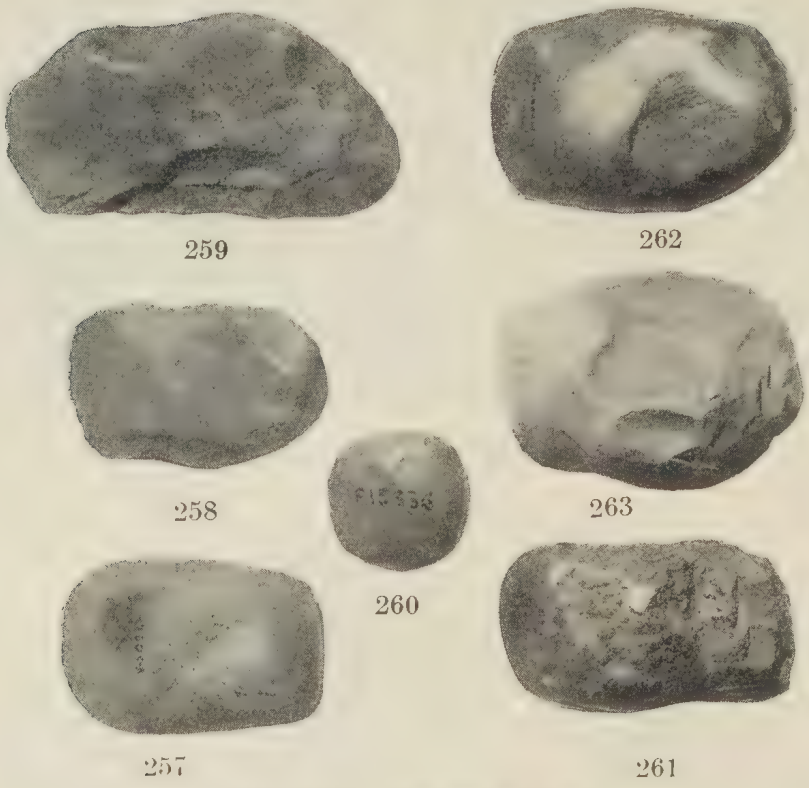
Uniface blade axe-head. (Figs. 263, 284.)

1877. Cox, p. 24.
1886. Macpherson, p. 114.
1895. Liversidge, p. 238, no. 27, pl. xxi.
1904. Roth, sect. 25, figs. 68, 70.

This type of axe-head consists of a heavy blade, with a plain cleavage face, an outer face bearing flake-scars, and a ground-edge at one end. The striking-platform is plain. The blade is usually thick and tongue-shaped.

Biface coroid axe-head (Figs. 260–262, 264–266, 274, 328).—The transverse section is referred to in brackets, and in some instances the discoid variety is mentioned in the list of references.

1872. Evans (round and discoid-lenticular), pp. 148, 150-2, fig. 105.
1878. Smyth (round and lenticular), Vol. II, pp. 359-78, figs. 176, 179-80, 182, 187-91, 197.
1881. Dawson, p. 24.
1886. Macpherson, pp. 113-5, figs. 1, 5.
1890. Edge-Partington and Heape (discoid-lenticular), Vol. I, pl. 354, No. 10; Etheridge (lenticular), pp. 369-70, pl. xiv, fig. 15.
1891. Etheridge, pp. 358-66, 372, pls. xxix-xxx (rectangular), pp. 366-7, 373-4, pl. xxxii, figs. 1-2.
1894. Tylor, pp. 335-40, pl. xvii, figs. 1-2.



Figs. 257-263. Edge-ground Axes.

257. Pebble type, showing percussive pit. Cedar Creek, Thirlmere, N. S. Wales. 258. Semi-biface pebble axe trimmed along both lateral margins. Gunnedah, N. S. Wales. 259. *Windang*-type, with trimmed lateral margins. Lindum, Queensland. 260. A small semi-circular inland variety of the biface coroid type, round section, south Central Queensland. 261. Biface coroid type, round section. Lake Alexandrina, South Australia, probably traded from western Victoria. 262. Biface coroid type, showing grinding extending from blade to body of axe. Round section, Yancannia, western N. S. Wales. 263. Uniface blade, showing flake-scars made prior to detachment from nucleus. South-west Queensland.

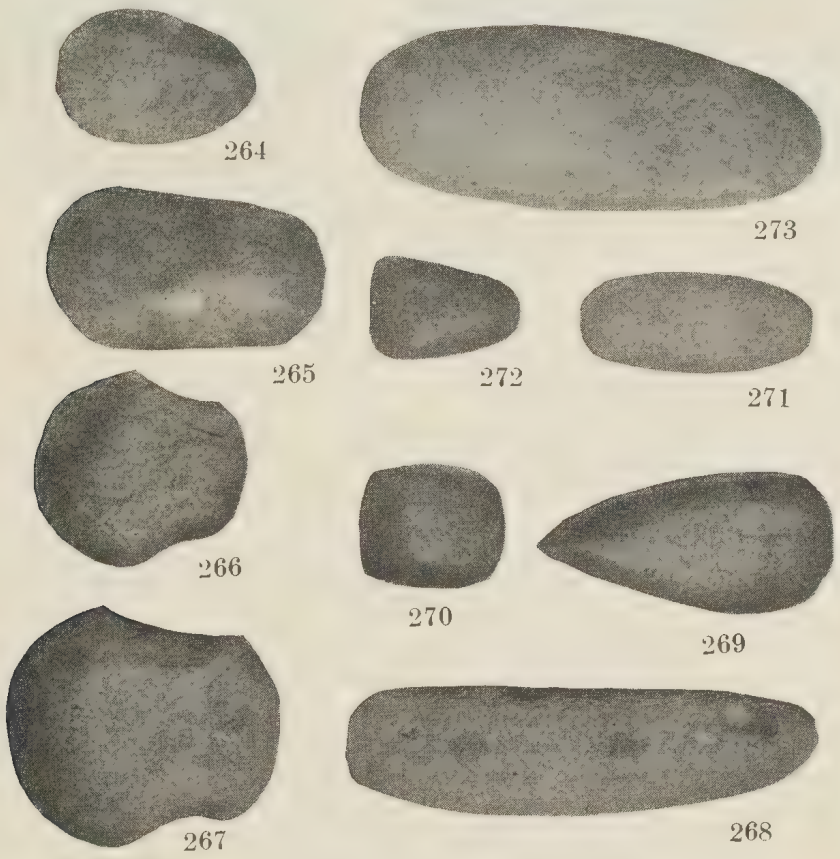
G. C. Clutton, photo. 0·3 nat. size.

1895. Liversidge, pp. 236, Nos. 14-5, pls. xviii-xix; Mathews, pp. 303-4, pl. xliii, fig. 1.
1896. Stirling, p. 98.
1897. Roth, pp. 18-9, figs. 58, 63-4, and (discoid-lenticular) sect. 258, fig. 391; Worsnop (round and lenticular), pp. 97-9, 110, pl. 52.
1898. Edge-Partington and Heape, Vol. iii, pl. 141, No. 9.
1901. Kenyon and Stirling (round and discoid-lenticular), p. 195 and table, pl. xxviii, figs. 2-3.
1904. Roth, sect. 25, figs. 63-4.
1908. Eylmann, p. 367, pl. xxiii, fig. 6.
1909. Daley, pp. 498-502; Mulder, pp. 8-10.
1914. Kenyon and Mahony, p. 7; Spencer, *B*, pp. 76-7, fig. 25.
1915. Hamlyn-Harris, p. 95.
1918. Roth, p. 10.
1921. Horne, *A*, pp. 11-2, figs. 44-5; *B*, pp. 49, 51.
1922. Spencer (axes and wedges), pp. 75-6, 83-6, figs. 157-8, pl. xv.
1925. Spencer, p. 32.
1928. Thorpe and Stanley, p. 210.
1930. Hale and Tindale (round), p. 208, fig. 245.
1931. Enright, pp. 71-2.
1932. Thorpe (round and lenticular), pp. 304-6, pl. xxvii, 6; xxix, figs. 1-2; xxxi, 3-4, 7.
1933. Cobb, pp. 163-5.
1937. Warner, pp. 470-1.
1938. Davidson (round and lenticular), *A*, pp. 42-4, fig. 2; *B*, pp. 68-71.
1939. Croll, fig. 1; Jackson, pp. 291, 295.
1940. Casey, pp. 27-9; McCarthy, *B*, p. 249, pl. Z, fig. 2, and (discoid-lenticular), pp. 252, 261, 268, 304, 312, pl. Z, fig. 6; *C*, p. 224, figure; Mitchell, p. 184, fig. 5, pl. xvi.

1941. McCarthy, *E*, pp. 19-20; Tindale and Birdsell, p. 8.
1943. Campbell and Noone, p. 383; McCarthy, *A*, p. 136; Mitchell, p. 62; Noone, *A* (lenticular), p. 273, figs. 1-2.

The majority of biface coroid axe-heads are oval or irregular in transverse section. They are, however, generally rounded on the lateral margins and may be convex or flat on the upper and lower surfaces. It is probable that some are made from knapped blades, but the great majority are fashioned from quarried lumps or from nodules or pebbles. The shape varies considerably, and it may be oval, ovate, elongate, rounded, triangular, rectangular, quadrangular, wedge or gad-like. Shape is not a satisfactory criterion of classification for these axe-heads as a whole, but it is of some value in distinguishing local types. The width of the ground facets varies considerably, and the grinding frequently extends well up the body of an axe-head.

The biface coroid axe-heads with lenticular transverse section are usually carefully fashioned. They are distinguished by a trimmed edge which extends right round the periphery, in the middle axis of the margins. Notable local varieties are the (*a*) (Fig. 265) rectangular form, with rounded corners, of the Kimberleys, (*b*) (Fig. 274)



Figures 264-273. Edge-ground axes.

264. Biface coroid, with very narrow ground edge at one end. Lenticular section. Tamworth, N. S. Wales. 265. Biface coroid, almost completely polished on both surfaces. Lenticular section. Forrest River, Kimberleys, Western Australia. 266. Biface coroid of tanged or shouldered type. Lenticular section. Lake Eyre district, Central Australia. 267. Pecked, tanged or shouldered type. Lenticular section. Cooper's Creek, south-west Queensland. 268. Pecked type, round section. Tenterfield, N. S. Wales. 269. Pecked type, round section, Lachlan River, N. S. Wales. 270. Pecked type, round section. Pyramid Creek, Hill End, N. S. Wales. 271. Pecked type, round section. Rock Flat, N. S. Wales. 272-273. Pecked type, round section. South-west Queensland.

G. C. Clutton, photo. 0·2 nat. size.

the discoid form of central and western Queensland, and (*c*) (Fig. 264) the discoid and oval forms of the northern tableland of New South Wales.

The tanged or shouldered biface coroid axe-head (Fig. 266) is distinguished by its concave lateral margins, which are formed by trimming and may extend from the butt to the end of the blade; the body of the axe-head is thus a broad tang, often lenticular in transverse section. The type appears to be limited to North Australia and western Queensland from where specimens were traded to Central Australia and far western New South Wales. Tanged or shouldered axe-heads have been referred to by Roth (1904, sect. 25, fig. 60), Horne and Aiston (1924, p. 99, fig. 75, middle and bottom), McCarthy (1940, *A*, pp. 43, 47, pl. ix, figs. 3–4, 1940, *B*, pp. 252, 261, 268, pl. Z, fig. 7, and 1940, *C*, p. 226, figure). These references include pecked examples in addition to the biface coroids.

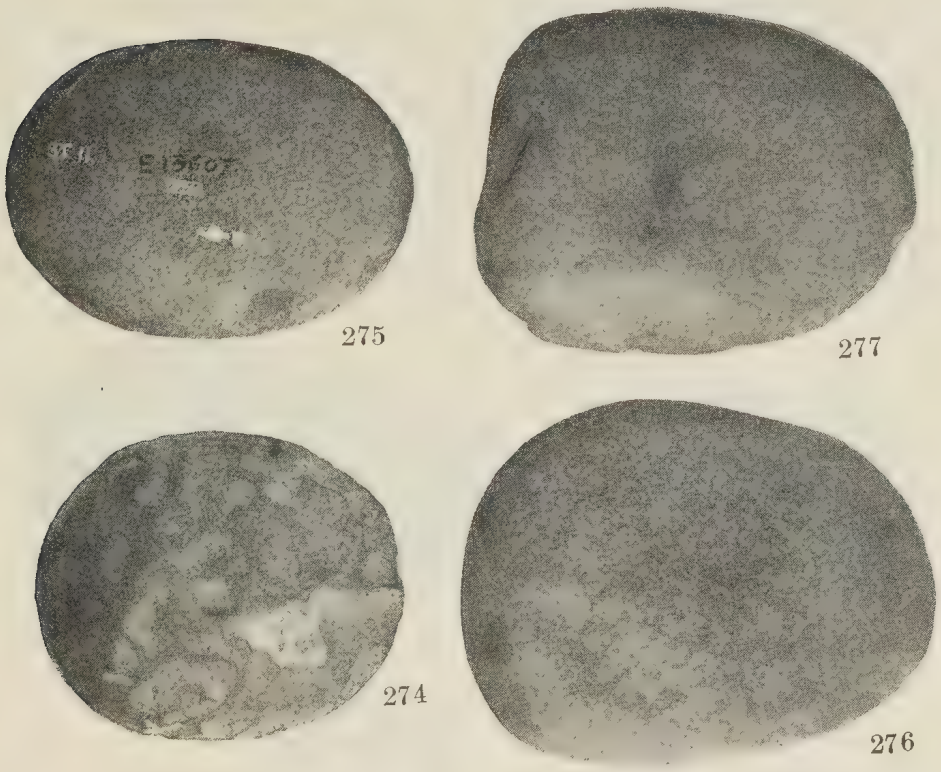
Pecked axe-heads (Figs. 267–73, 275–276).—The varieties are referred to in parentheses in the list of references.

1878. Smyth (notched axes and wedges), Vol. I, pp. 359-78, figs. 184, 196.
1891. Etheridge (round and lenticular-discoid), pp. 363-4, 369-77, pl. xxx, figs. 3-4, xxxi, 1-2, xxxiii-xxxiv.
1893. Etheridge, pp. 297-8, pls. xii-xiii.
1894. Tylor (discoid-lenticular), pp. 335-40, pl. xvii, fig. 3.
1895. Helms, pp. 400, 403-4, pl. xxix, fig. 4; Liversidge, pp. 234, 237-8, Nos. 2, 22, 24, 28, pls. xiv-xv, xxii.
1898. Picked axes, Edge-Partington and Heape, Vol. iii, pl. 141, Nos. 10, 13, pl. 143, Nos. 1-2, 6-7.
1899. Spencer and Gillen, p. 588, fig. 117.
1901. Axes and wedges, Kenyon and Stirling (round and lenticular), pp. 195-6 and table, pl. xxviii, fig. 4; xxix, 1-2, xxx, 1-3; xxxii, 2.
1904. Spencer and Gillen (lenticular), pp. 656-61, 708-9, figs. 198-203, 281-2.
1914. Picked surface, Kenyon and Mahony, pp. 7-8; Spencer (discoid-lenticular), *B*, fig. 25, Nos. 1-2.
1915. Hamlyn-Harris (lenticular), *C*, p. 95, figs. 1-7.
1918. Surface with natural pittings, Roth, p. 10, pl. B, figs. 1-7.
1921. Horne (round and discoid-lenticular), *A*, p. 11, figs. 46-7.
1922. Spencer, pp. 76, 84, fig. 157.
1924. Horne and Aiston (discoid-lenticular), p. 99, fig. 75; Marks, p. 93, pl. xxii.
1925. Pescott, pp. 122-4.
1927. Spencer and Gillen, pp. 548-50, figs. 212-7, 224.
1932. Pecked and pitted axes, Thorpe (round and discoid-lenticular), *B*, pp. 305-6, pl. xxx, fig. 1.
1936. Fürer-Haimendorff, p. 30.
1936. Bruised axes, Croll, fig. 1.
1940. Hammer-dressed axes, McCarthy (round, lenticular and rectangular), *A*, pp. 40-3, 47, pls. vii-ix, map, *B*, pp. 249, 261, 268, 312, pl. Z, fig. 3; *C*, p. 225, figure; Mitchell, p. 184, fig. 11, pl. xvi.
1941. Mitchell, p. 373; Tindale and Birdsell, p. 8.
1943. Hammer-dressed or pecked axes, Noone, *A*, p. 273.

The pecked axe-head is a well developed and widely distributed type in Australia. By means of the pecking, or hammer-dressing technique, the smooth surfaces of pebbles are roughened, and the rough surfaces, composed of flake-scars separated by ridges, of biface coroid axe-heads are smoothed. The two main kinds of transverse section are the rounded and the lenticular, but the small semi-circular axe-head of western New South Wales is sometimes rectangular in section. The shape of pecked axe-heads is variable, but is often characteristic in defined areas; local varieties defined by shape are the (*a*) (Fig. 271) elongate round-section form of south-east Australia, (*b*) (Fig. 260) small semi-circular form of far-western New South Wales and Queensland, (*c*) (Fig. 275) large discoid lenticular-section form of central and western Queensland, and (*d*) (Fig. 276) large oval lenticular-section form of north-east Queensland, some examples of which are so big that they were probably ceremonial implements.

The tanged or shouldered axe-head is frequently pecked.

Pecked and grooved axe-heads (Figs. 278–283).—The shape and transverse section are referred to in brackets in the list of references.



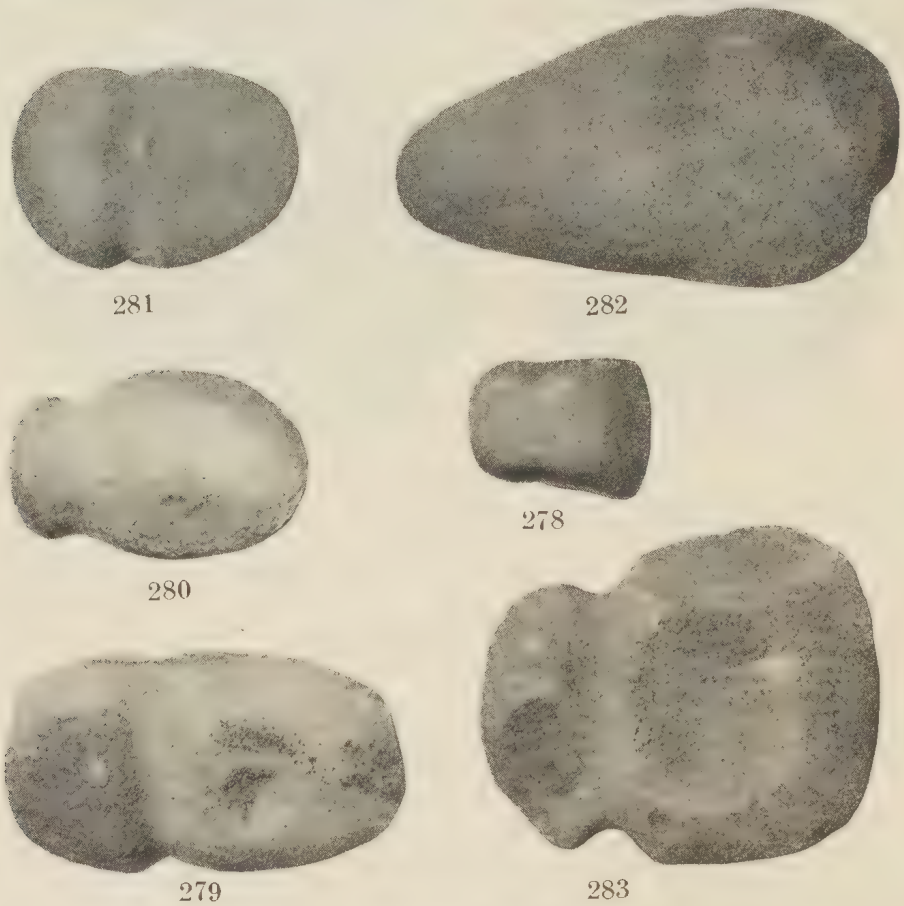
Figures 274-277. Edge-ground Axes.

274. Biface coroid, lenticular section. North central Queensland. 275. Pecked, lenticular section. Boulia Creek, central Queensland. 276. Pecked, lenticular section. North-east Queensland. 277. Polished, lenticular section, Hambledon, Cairns district, north-eastern Queensland. G. C. Clutton, photo. 0·2 nat. size.

1878. Axes and wedges, Smyth, Vol. I, p. 372, fig. 195.
1886. Axes or wedges, Macpherson, pp. 114-5, fig. 4.
1891. Etheridge, pp. 367-8, pl. xxxi, figs. 3-4.
1893. Etheridge, pp. 295-7, pls. xi-xiii.
1897. Dressed axes, Worsnop, p. 109.
1898. Edge-Partington and Heape. Vol. iii, pl. 141, No. 5, pl. 143, No. 3.
1901. Axes and wedges, Kenyon and Stirling (round, lenticular and rectangular), p. 196 and table, pl. xxxi, figs. 1-2; xxxiii, 1-2; Spencer, pp. 80, 85.
1904. Roth (lenticular), sect. 25, figs. 62-75.
1914. Wedges, Kenyon and Mahony, pp. 8-9.
1915. Axes and wedges, Breton, p. 25; Hamlyn-Harris, *C*, p. 95, figs.
1918. Roth, p. 19.
1922. Axes and wedges, Spencer, pp. 76, 85.
1924. Horne and Aiston, p. 99.
1925. Basedow, *B*, pp. 362-3; Pescott, pp. 122-4.
1926. Thorpe and Stanley, pp. 210-1.
1927. Doak and Doyle, pp. 38-9.
1928. Spencer, Vol. II, pp. 496-500, figs. 338-42.
1932. Thorpe, *B*, pp. 305-6, pl. xxxi, fig. 5.
1934. Enright, p. 203, figure.
1936. Rillenbeil, Fürer-Haimendorff, pp. 29-31, 441, figs. 33-4.
1938. McCarthy, p. 40.
1940. Casey, p. 27; Cooper (rectangular), pp. 224-5, figs. A-C, pl. xxx; McCarthy (waisted, necked and encircling hafting grooves), *A*, pp. 40-3, 47, fig. 3, pls. vii, ix; *B*, pp. 249, 251, 268, pl. Z, fig. 4; *C*, pp. 225-6, figure; Tindale, p. 26, fig.
1941. Black, p. 34.

The pecked and grooved axe-heads are classified primarily according to the nature of the groove. It may be limited to the lateral margins and form a neck or a waist, in which case the two grooves may be at a reverse angle to one another, or it may encircle

the axe-head; on some examples (Fig. 279) a flat ungrooved surface is left on one lateral margin, evidently the lower one when hafted, to provide a thick side for the stronger binding of the withe. Occasionally two or three encircling grooves are present on the one specimen. The varieties are then distinguished by transverse-section, the round and lenticular forms being the commonest in occurrence, and the rectangular section rare. Some specimens are ground from the edge of the blade to the groove, and the blade is either lenticular or rectangular in section while the butt is oval. Local varieties may also be further differentiated according to shape, but insufficient data are as yet available about the pecked and grooved axe-heads to define them accurately by this character. The groove varies from the shallowest depression to a deep channel marked by ridges on both sides.



Figures 278-283. Edge-ground Axes, Pecked and Grooved.

278. Waisted, round section. Yancannia, N. S. Wales. 279. With single transverse groove not completed on margin. Round section on butt, lenticular blade. Note percussive pit on blade. Gundablui, western N. S. Wales. 280. Single transverse groove near butt. Lenticular section. Lake Cudgellico, N. S. Wales. 281. Single transverse groove. Round section on butt, lenticular blade. Stannifer, N. S. Wales. 282. *Wanalta*-type, Buckley Swamp, Rushworth, Victoria. 283. *Parruthri*-type. Round section. Gobarup, Rushworth, Victoria.

G. C. Clutton, photo. 0·3 nat. size.

Wanalta axe-head. (Fig. 282.)

1901. Wedges, C.B.2.c., Kenyon and Stirling, p. 196 and table, pl. xxxii, fig. 1; Wedge, Spencer, p. 82, No. 18.
1906. Multiple grooved axes, Williamson, p. 19, figure.
1914. Grooved wedge, Kenyon and Mahony, p. 9.
1939. Grooved axe, Croll, figure.
1940. Hammer-dressed and grooved axe with encircling and butt grooves, McCarthy, *C.* p. 226, figure.

The *wanalta* axe-head is an important local variety, which occurs in Victoria, of the pecked and grooved type. It is distinguished by possessing median and diagonal grooves which extend from the encircling groove on one surface over the butt to the encircling groove on the other surface. In transverse section it is usually lenticular or flattened oval. The name is derived from one of the first localities (Spencer, 1901, p. 82) from which the type was recorded. It is from medium to large in size.

Pur-rut-thri axe-head. (Fig. 283.)

1878. Axe (*Pur-rut-three*), Smyth, Vol. I, pp. 368-9, fig. 183.
1901. Ground wedge (*Purut-thri*), Spencer, p. 82, Nos. 16-17.
1914. Axes used as mills, Kenyon and Mahony, p. 4.
1922. Grinding surfaces on axes, Spencer, p. 77.
1934. Axes or wedges with hollow, Anonymous, p. 170.
1936. Grooved axes with millstone hollows, Casey, pp. 93-4.
1940. Hammer-dressed and grooved axes with encircling groove and mortar depression, McCarthy, *C*, p. 226, figure.

The *Pur-rut-thri* axe-head is another important local variety of the pecked and grooved type. It occurs in Victoria and southern New South Wales, and is distinguished by possessing a mortar depression on one or both surfaces between the groove and the edge of the blade. It is usually rounded or lenticular in transverse-section, and from medium to large in size.

Fully ground or polished axe-heads (Fig. 265).—This type is comparatively rare in Australia and occurs more commonly in northern areas than in the southern region of the continent. Examples with either rounded or lenticular transverse section are known. The grinding or polishing is sometimes done over a previously knapped surface but more usually over a pecked surface. Axe-heads referred to as polished by some authors are edge-ground only.

Fully ground or polished and grooved axe-heads.—This type is also rare in Australia but examples with either rounded or lenticular transverse section have been found. The groove may be marginal or completely encircle the axe-head.

ADZE-HEADS. (Figs. 284–289.)

1891. Chisel-shaped axes, Etheridge, pp. 366-7, pl. xxxii, fig. 1-2.
1901. Adze-shaped and adzes, Kenyon and Stirling, p. 194 and table, pl. xxvii, figs. 7-9, 12.
1921. Polished axes, Horne, *A*, p. 11.
1924. Sub-cylindrical stone implement, Marks, p. 93, pl. xxii.
1932. Pike, Thorpe, *B*, pp. 306-7, pl. xxix, fig. 3.
1935. Adzes, Davidson p. 155, pl. ix, figs. 1-3.
1938. Polished axes, Davidson, *A*, pp. 44-5, fig. 3; *B*, pp. 70-1.
1939. Grooved conical stone, McCarthy, pp. 4-5, figs. 2, 8.
1940. Polished round axes, McCarthy, *A*, p. 43; Adzes, McCarthy, *B*, pp. 251, 268; Adze and adze-type blades, McCarthy, *C*, p. 227, figure.
1943. Polished axes with squared-off side margins, Noone, *A*, pp. 274-5, 279, figs. 10-2, 30-1.
1944. Adzes and adze-like implements, McCarthy, *D*.

The axe is the predominant edge-ground implement in Australia, but occasional adzes and adze-like implements are found in scattered localities. The chief characteristic of the adze is the asymmetrical blade with its edge above or below the middle axis; the upper facet is usually rounded, and the lower facet varies from convex to concave and is often at a steep angle. Such implements are hafted with the blade at a right angle to the haft. The body of the adze varies widely in shape. In Australia there are five types of adze-heads, the (*a*) (Figs. 285–286) biface coroid, (*b*) (Fig. 287) pecked, (*c*) (Fig. 289) pecked and grooved, among the edge-ground and semi-ground or polished forms, (*d*) (Fig. 288) fully ground or polished, and (*e*) fully ground or polished and grooved. These types are further subdivided by transverse section, round and lenticular forms being recorded, and in addition a hog-back section with is semi-circular on the upper surface and slightly convex on the lower surface. The latter is the most distinctive adze-head yet recorded in Australia.

Figures 284-289. Edge-ground Adzes.

284. Trimmed uniface blade, with adze-like working edge. Lawn Hills, central Queensland. 285. Biface coroid adze, rectangular section. Hexham, N. S. Wales (Chert). 286. Biface coroid, pear-shaped, round section. Darling Downs, Queensland. 287. Pecked adze, hog-backed section. Murtee Station, Wilcannia district, western N. S. Wales (Quartzite). 288. Polished adze, hog-backed section, Booligall N. S. Wales. 289. Large pecked and grooved adze, hog-backed section. Igneous rock. Oberon, N. S. Wales.

After McCarthy, 1944, Pl xvii, figs. 1-6.

G. C. Clutton, photo. 0·3 nat. size.

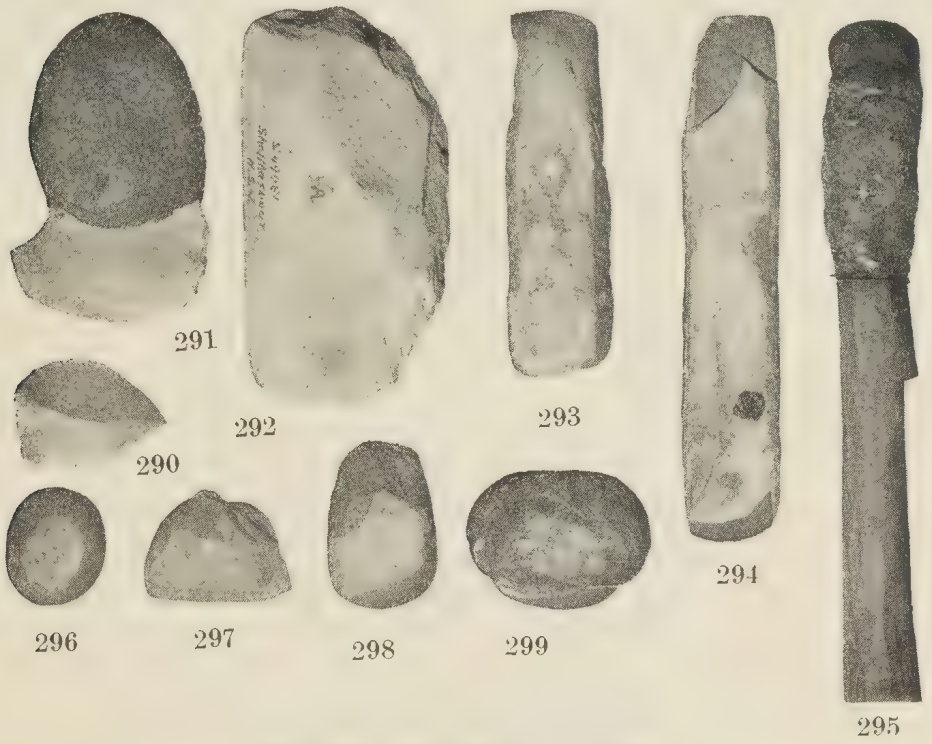
The adze-like edge-ground implements (Fig. 284) possess an adze-like blade but no other characteristics of the adze-head. They occur in many types of axe-heads, but most commonly among the biface coroid and pecked types.

McCarthy (1944, *D*) has given a general description of adze-heads and adze-like implements, dealing mainly with New South Wales specimens.

Scraper-knives and Chisels. (Figs. 292–300.)

1886. Chisel, Macpherson, pp. 113, 116, fig. 3.
1890. Abnormal tomahawk, Etheridge, pp. 291-2, pl. xiii, figs. 11-2.
1894. Toy tomahawk, Etheridge, pp. 298-9.
1897. Children's axe, Worsnop, p. 109.
1898. Edge-Partington and Heape, Vol. III, pl. 141, fig. 6, pl. 143, fig. 13.
1901. Knives or scrapers, toy tomahawks, Kenyon and Stirling, p. 196 and table, pl. xxx, figs. 4-6; Ground-stone knives, Spencer, p. 82, Nos. 19-24.
1914. Miniature ground axes or knives, Kenyon and Mahony, p. 8.
1921. Skinning knives, Horne, *A*, p. 11, and polished knives, p. 9, fig. 28.
1922. Ground-stone knives, Spencer, pp. 86-7.
1923. Small ground knives, MacGillivray, p. 69.
1932. Ground skinning knives, Cobb, *B*, p. 100.
1933. Skinning knives, Cobb, p. 164; Ground-edge knives and chisels, Thorpe and McCarthy, pp. 23-6, pls. vii viii.
1934. Miniature ground axes as knives and chisels, *Anonymous*, p. 171.
1935. Davidson, p. 165.
1939. Miniature Mallee axes, Croll, fig. 1.
1940. Chisel, Mitchell, p. 184, fig. 10, pl. xvi.
1943. Small edge-ground cutting tools, Noone, *A*, p. 273.

This is one of the most difficult types of edge-ground implements to classify because the types merge imperceptibly into one another and each type was apparently employed for several purposes. Generally speaking, those with the ground working edge on the longest margin are called scraper-knives (Figs. 296–297, 299), and those with the ground working edge on the shortest or end margin are called chisels (Figs. 293–294, 298). Each type may then be further subdivided according to form, comprising (*a*) flake or scrap, (*b*) pebble, (*c*) trimmed biface coroid, and also by the shaping processes which include (*a*) pecking and (*b*) fully ground or polished. In size the scraper-knives range from about 2·5 cm. to 7 cm. in width and the chisels up to about 20 cm. long. Both types were hafted (Fig. 295) in a mass of gum-cement on the end of a short handle, and possibly in other ways, while the scraper-knives (Fig. 299) were sometimes fitted with a gum-grip along the margin opposite the working edge. They apparently occur throughout the distribution of the ground-edge in Australia. Thorpe and McCarthy (1933) have given a general description of both types.



Figures 290-299. Knives and Chisels.

290. Circumcision knife, an untrimmed flake. Lake Eyre district, Central Australia. (After Aiston.) Quartzite. 291. Chalcedony knife, trimmed edge, gum grip. Alice Springs, Central Australia. 296-297, 299. Edge-ground scraper-knives, one with gum grip. Cooper's Creek, Lake Eyre district, Central Australia, Lower Murray River and Coonamble, N. S. Wales. 293-4, 298. Edge-ground chisels, one with blade at each end. Coonamble and Wandandian, N. S. Wales. 295. Hafted edge-ground chisel, junction Lachlan and Darling River, N. S. Wales. 292. *Bulga*-scraper-knife, Shellharbour, N. S. Wales.

G. C. Clutton, photo. 0·4 nat. size.

There are two specialized forms of the scraper-knives, the *Bulga*-type and the reniform-type.

Bulga scraper-knife. (Fig. 292.)

1886. Knife, Macpherson, pp. 113, 116, fig. 2.
1889. Skin-dresser, David and Etheridge, *B*, pp. 140-4; Skinning knife, David and Etheridge, *A*, p. 12, fig. 5.
1895. Ground-edge knives with lateral blade, Mathews, p. 304, pl. xliii, fig. 2.

1931. Chipped-back implement with ground edge, Halliday, p. 3.
1933. Unusual ground-edge implements, Thorpe and McCarthy, p. 26, pl. ix.
1934. Ground-edge knife, Kennedy, E., *A*, pp. 200-1; McCarthy, pp. 240-1.
1937. Hand-axes or choppers, Mitchell, pp. 41-2, pl. vi.
1940. Skinning-knives, McCarthy, *C*, p. 228.

The *Bulga* scraper-knife is generally crescentic in shape. The ground working edge is usually straight and the opposite margin crescentic and neatly trimmed but on irregular specimens may be straight. It is up to about 13 cm. in length. This implement has generally been regarded as a skin-dresser, although there is no first-hand evidence to support this view, but recent evidence from the Kimberleys (Mitchell, 1937) revealed that it is also employed in shaping wooden containers and is fitted with a gum-grip along the trimmed margin. Some of these implements are made by the split-pebble technique. The name Bulga is derived from a locality on Cockfighter Creek, Hunter River Valley, New South Wales, where excellent examples have been collected.

Reniform scraper-knife. (Fig. 300.)

1924. Reniform slate object, Campbell, pp. 74-8, figs. 1-3.
1925. Slate scraping implements, Basedow, *A*, 106, figs. 1-2; skin-scrapers, Basedow, *B*, p. 366, pl. xliii, fig. 3.
1926. Reniform slates, Hossfeld, p. 291, figs. 4*a-c*.
1934. Undetermined implement, Howchin, pp. 79-82, fig. 147.

The reniform scraper may be classified as a variety of the *Bulga* scraper-knife. Basedow (1925, *B*) describes it as follows: "The specimens are either blue, brown, or banded clay-slate. The general form is a flat segment, approximately equal to or greater

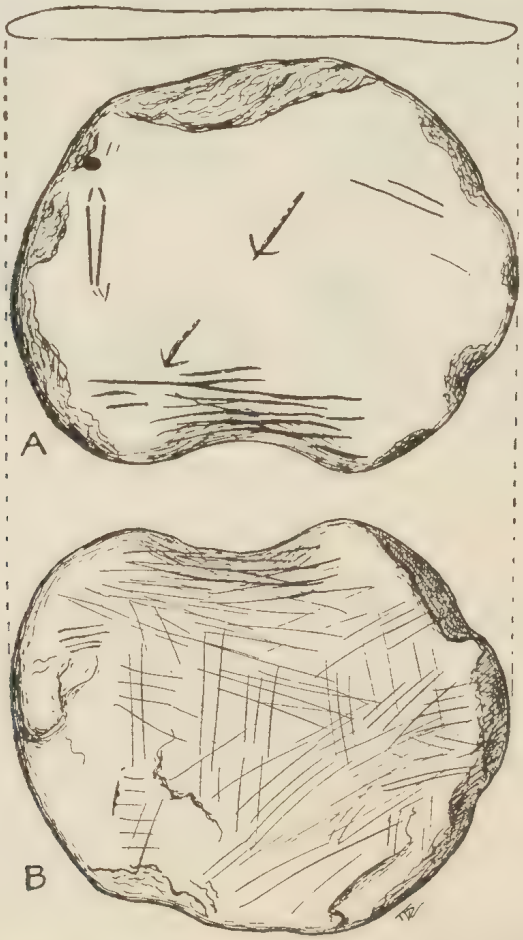


Fig. 300. Reniform knife, showing incised bird-tracks and other markings, trimmed margins, and concave use-polished working edge. Pedlar's Creek entrance, South Australia. Nat. size.
After Campbell (1924), p. 76.

than half a circle, the two corners at which the arc meets the chord being rounded off. The edge representing the chord is either straight or notched at the centre. The circular edge is bluntly "shaped" (trimmed), while the straight or grooved edge is invariably sharpened by grinding or scraping. . . The flat surfaces are roughly smoothed by a process of rubbing or rasping, in consequence of which a number of irregular furrows and scratches have remained. In one or two instances these markings are more symmetrical and may represent an intentional pattern." The markings include arrow or bird-track incisions. The length ranges from 7·5 to 12·5 cm., and they are up to 8 cm. wide and 1·25 cm. thick. The working edge is concave. They appear to be limited in distribution to the Adelaide Plains, South Australia. Basedow also describes their use in scraping skins. The working edge is use-polished.

Alien Axe-heads, Adze-heads and Edge-ground Implements.

From time to time specimens are found, both on the surface and under-ground, which are un-Australian in type and whose origin is unknown. Thus Davidson (1935, p. 155, pl. ix, figs. 1–3) recorded three polished adzes from Western Australia, and various axe-heads and adze-heads have been found along the eastern Australian coast. Thorpe (1929, *B*. 1931, *E*) described a rectangular-sectioned adze from Dark Point, New South Wales, and others have been found along the foreshores of Port Jackson. In most cases they were probably introduced by Europeans, ships' crews, immigrant natives, or by traders; in the case of Davidson's specimens, which are highly developed neolithic forms widely distributed in the eastern Indonesian islands (Celebes, Ambon, etc.), New Guinea, and Melanesia, it is probable that the aborigines of the north-west coast obtained them from Malayan proa traders from Makassar, Papuan pearl-divers, or even from white people, and traded them along established routes.

PERCUSSION AND ABRADING IMPLEMENTS.

Percussion Stones. (Figs. 301–307, 314–315, 327.)

Referred to as hammerstones or hammers, unless otherwise stated, in the list of references.

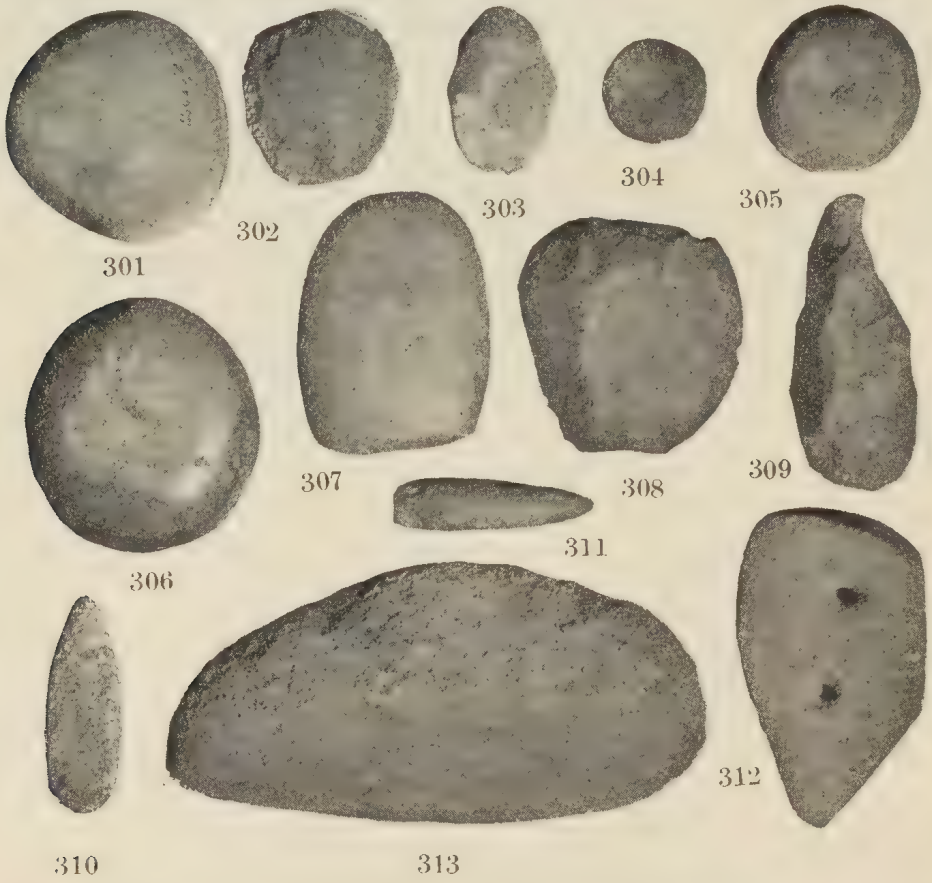
1878. Fishing stones, Smyth, Vol. I, p. 385, fig. 222.
1898. Projectile, Edge-Partington and Heape, Vol. III, pl. 143, figs. 4-5, 17-8 (fig. 18, grooved).
1899. Stones for breaking bones, Harper, p. 329.
1901. Kenyon and Stirling, p. 197; chipping hammers, Spencer, p. 83.
1903. Clement, p. 4, pl. iii, fig. 18.
1904. Roth, sect. 37, Figs. 150-4.
1907. Knappers, Etheridge, Etheridge and Whitelegge, p. 250.
1909. Pounding stones, Daley, p. 501; percussion stones, Mulder, p. 250.
1914. Kenyon and Mahony, p. 9.
1915. Pounding stones and hammers, Breton, p. 25.
1916. Hammerstones, pounders, Glauert, p. 44 (some grooved).
1919. Fabricators and pounding stones, Howchin, pp. 82-3; White, pp. 80, 83.
1921. Horne, *A*, p. 12, figs. 52-7; *B*, pp. 49, 51; choppee, Horne, *A*, p. 10, figs. 34-7; hammer or braying stones, fabricators, Howchin, *A*, pp. 280-1; Pulleine, p. 279.
1922. Spencer, p. 88.
1924. Horne and Aiston, pp. 87, 97, 99.
1925. Pounding stones, Basedow, *B*, p. 360; Bolam, p. 85.
1927. Doak and Doyle, p. 32; Hammerstones with finger-grips, Kenyon, pp. 281, 285.
1928. Pecking hammers, Spencer, p. 497, fig. 338.
1930. Hale and Tindale, pp. 158, 169, 171, 177, 190, 198.
1931. Mitchell, p. 162; hammerstones and pounders, Rolfe, p. 37; Tindale and Maegraith, pp. 280-1, 283, 286, figs. 2-5.
1932. Kennedy, K., *A*, pp. 106-9; basalt hammers or pounders, Thorpe, *B*, p. 302, pl. xxvii, figs. 1, 3, 7-8.
1933. Flaking stones or pounders, Cobb, pp. 163-5.
1934. Anonymous, p. 171; Fabricators and pounding stones (one grooved), Howchin, pp. 69-73, figs. 123-9; Kennedy, E., *A*, pp. 200-1; McCarthy, pp. 240-1; choppee, Turner, *A*, p. 229.
1935. Towle, pp. 126, 128.
1936. Fürer-Haimendorff, p. 12; pounding stones, Thomson, pp. 71-2, 74, pl. viii, figs. 1-4.
1937. Tindale, pp. 39-60, figs. 12-3.
1939. Percussion stones (*Brachina*-type), Mountford, pp. 12-4, figs. A-H.

1940. Grooved hammerstones, McCarthy, *A*, p. 42; *B*, p. 262; Mitchell, p. 184, pl. xvi, fig. 9.

1941. McCarthy, *B*, p. 263, fig. 9; percussion stones, McCarthy, *C*, pp. 329-30, 332, figure; McCarthy, *E-F*, pp. 20, 22, pl. iv, fig. 5; Knapping and trimming tools, Tindale and Noone, p. 121.

1943. Percuteurs or hammerstones, Campbell and Noone, *A*, p. 303, figs. 109-10; Polyhedral implements, pounders, Campbell and Noone, *B*, p. 383; Cooper, *A*, p. 348; Fabricators, Noone, *A*, p. 272.

The percussion implements form a puzzling group to classify. There is little precise information about them, and in only a few instances is there any published record of first-hand observation of their use by the aborigines. A great deal of misconception has also arisen because of the incorrect application to them of such names as hammer, anvil, husking, pestle and pounding stones by which they are commonly known. These terms are suitable in some instances, but they have been taken over from our own tools of similar function and applied to the aboriginal implements in a manner that has made the implement fit the term rather than the reverse. Actually, the same percussion stone



Figs. 301-313. Percussion and Abrading Implements.

301. Percussion-muller, used for percussion on sides and as a muller on both surfaces. Condobolin, N. S. Wales. 302. Trimmed coroid percussion stone. Bathurst, N. S. Wales. 303. Pebble percussion stone showing marginal and surface use. Shellharbour, N. S. Wales. 304-305. *Kulki*-type percussion stones. Walcha, and Avoca Holding, Darling River, N. S. Wales. 306. Pebble percussion stone showing anvil pit. West-central Queensland. 307. Pebble edge-ground axe, with blade end worked back by percussion and grinding use to a flat face. Mangrove Mountain, N. S. Wales. 308. Rock engraving implement. Mangrove Mountain, N. S. Wales. 309. Oyster-pick of *Riambi* type. Mornington Island, Gulf of Carpentaria, Queensland. 310-311. Fishhook tiles of triangular shape from Quibray, and cylindrical type from Murramarang, N. S. Wales. 312. Wedge-shaped piece of sandstone bearing two perforations. Tambar Springs, N. S. Wales. 313. Pecked muller, worked on both surfaces to form a pseudo ground edge. Sandstone. South-west Queensland.

G. C. Clutton, photo. 0·3 nat. size.

may be used by the aborigines on its margins and upper and lower surfaces for a variety of purposes, including knapping and trimming, for pounding ochre, nuts, bones and seeds, for breaking open and striking off shells, and for shredding bark. Thus, while the hammerstone is one of the most versatile and important tools of the stone age, the name itself denotes only one variety of percussion stone. It is no doubt correct to employ the above English terms for individual implements, and even for types when such are known to have been used for a specific purpose, but it is necessary to take into consideration the whole of their functions in adopting a group name. Shape is not of much importance in their classification.

In addition, there is no line of demarcation between subdivisions of percussion stones. Some are so small that their only function could have been for trimming edges, while larger examples of the same type have served a number of purposes, as above. Again, some small pebbles only 3 cm. in diameter bear percussive pits and are not strong enough to have formed anvils, but larger pebbles bearing the same pits are commonly referred to as anvils and husking stones.

To avoid any confusion or confliction of terms, and to simplify reference to the group, we have adopted the general name of percussion stones, embracing hammerstones, fabricators, trimming stones, detaching stones, and anvil-stones. These types may show signs of use on the end or lateral margins or on both, on the surfaces, or on the margins and surfaces. They are further classified according to methods of manufacture, which comprise (*a*) utilized pebbles, (*b*) trimmed lumps, and (*c*) pecked pebbles and lumps. Finally, some are grooved. The dimensions of percussion stones range from about 3 to 15 cm. long, but the anvil-stones may exceed this measurement.

The trimmed coroid percussion stones have not been given much attention in Australia. Like the pebble forms, they comprise detaching hammers for knapping flakes from nuclei, and the fabricators and trimming stones for secondary work in shaping implements and preparing working edges. They all show definite signs of percussion and pressure fracturing on their edges.

A great many, perhaps the majority, of axe-heads and adze-heads bear percussive use on their margins, butt and surfaces, the butt in particular forming a useful hammering surface. The percussive-pits on the upper and lower surfaces appear to be due to anvil use, being situated as a rule between the haft and the blade, although they are commonly known as finger-grips. Axe-heads are occasionally found on which the blade is battered to a flat percussion face, and there appears to have been a special use for such implements on Mangrove Mountain, New South Wales, where a large number of them have been collected. Many of the grooved percussion stones are old axe-heads.

Kulki percussion stone. (Figs. 304–305, 315.)

1895. Hammerstone, Liversidge, p. 236, No. 13, pl. xix.
1897. Nardoo pounding stone, Roth, sect. 155, fig. 243.
1921. Circular hammers, Horne, *A*, p. 12, fig. 56.
1924. Hammerstones (*Kulki*), Horne and Aiston, pp. 53, 97, 99-100.
1941. Cylindrical hammerstone, McCarthy, *B*, p. 263, fig. 9.

The *kulki* is a specialized percussion stone. It is cylindrical in shape, with flattened sides, and rounded edges where the sides join the upper and lower surfaces. It may be wider than it is thick, or vice-versa. The upper and lower surfaces frequently bear an anvil-pit in the middle, and evidence of use as a muller. The *kulki* percussion stone is widely distributed in inland Australia. The name is derived from the Wongkonguru language, where it is the tribal name for a hammerstone, in the Lake Eyre district of Central Australia. The diameter of the *kulki* is from about 5 to 15 cm.

The *Brachina*-type is a specialized percussion stone recorded by Mountford (1939) from South Australia and Kangaroo Island; it is an elongate implement with a percussive pit at one end.

OYSTER-PICKS. (Fig. 309.)

1903. Oyster-stones, Clement, p. 4.
1904. Oyster-stones or hand-picks (*Riambi*), Roth, sect. 35, figs. 144-9.
1934. Oyster-stones, Turner, *A*, p. 228.
1943. Oyster and shell picks, Cooper, *A*, p. 366, figs. 80-2.

Figures 314-315. Percussion Stones.

314. On left, anvil with three pits. Western N. S. Wales. 315. On right, mortar with *Kulki*-type pestle. Rushworth, Victoria.

After McCarthy, 1941*c*, p. 329.

G. C. Clutton, photo. 0·3 nat. size.

Various kinds of pebbles and lumps of stone were used for detaching oysters and other molluscs from rocks, and for opening the shells. Cooper (1943, *A*) has recorded three uniface pebble implements from Kangaroo Island which he considers to have been used for such purposes, and Turner (1934, *A*) has described ironstone picks of a similar nature from the Hawkesbury River, New South Wales. The *Riambi* is a specialized type of oyster-pick recorded from Bentinck, Mornington and Forsyth Islands, in the Gulf of Carpentaria, by Roth (1904). It is pear-shaped or pyriform, and has from three to four flat sides, each formed by the knapping of a large flake, the blow being struck at the thick butt-end. Both ends have flat or rounded battered surfaces. Roth's specimens are from 9 cm. to 13·5 cm. long, and the greatest thickness is from 4 cm. to 7 cm.

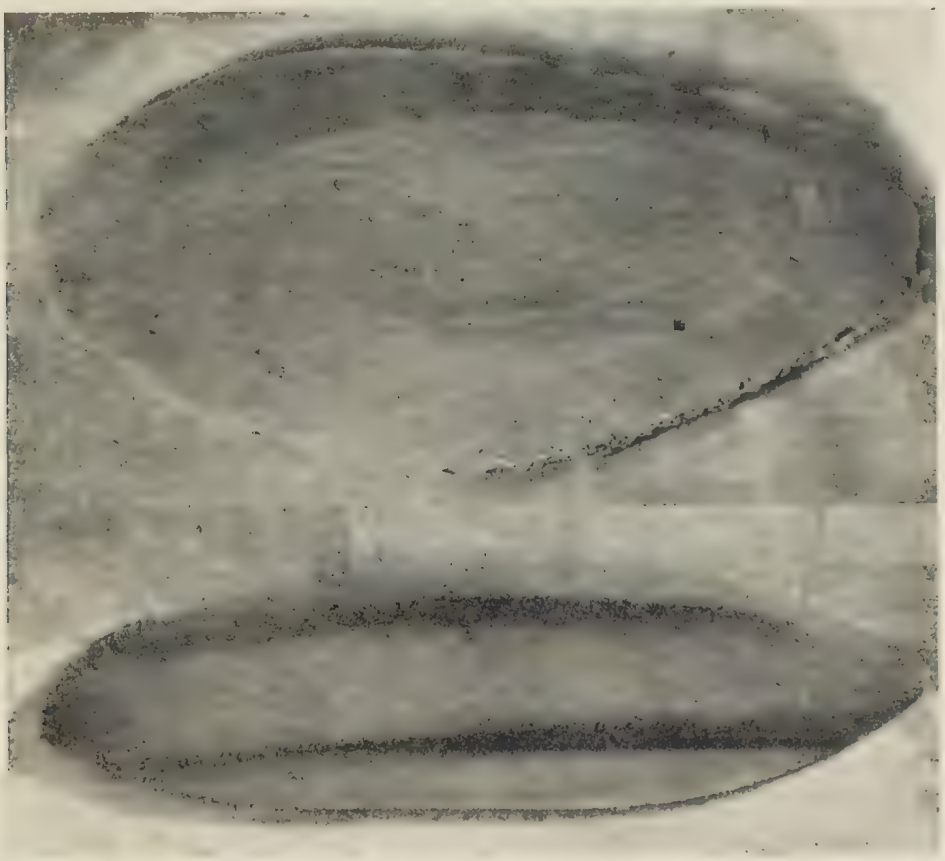
Anvil-stones. (Fig. 314.)

Referred to as anvils unless otherwise stated, and terms given to the pits are referred to in parentheses, in the list of references.

1898. Seed-grinder, Edge-Partington and Heape, Vol. III, pl. 141, fig. 2; pl. 143, fig. 17.
1901. Kenyon and Stirling (husking holes), p. 197; Spencer, p. 84.
1907. Etheridge and Whitelegge, p. 250.
1909. Mulder (anvil-pits), p. 10.
1914. Kenyon and Mahony (husking-holes, finger-grips), pp. 7, 9-10.
1921. Horne, *A*, p. 13, fig. 58; *B*, pp. 49, 51.
1922. Anvils or husking stones (one to six spherical hollows), Spencer, pp. 77, 88.
1924. Horne and Aiston, p. 100.
1927. Kenyon, p. 285.
1928. Thorpe and Stanley (anvil and husking pits), p. 211.
1931. Mitchell, p. 162; Rolfe, p. 37; nether stones and blocks, Tindale and Maegraith, p. 281.
1932. Kennedy, K., *A*, pp. 106-9; Thorpe (finger-grips), *B*, p. 305, pl. xxix, fig. 5.
1934. Anonymous (dimples or indentations), p. 171.
1936. Mahony, p. 36.
1941. McCarthy, *B*, p. 263; Mitchell (husking stones), p. 373.
1943. Pitted stone, Campbell and Noone, *B*, p. 383; Cooper (pitting on pebble implements), *A*, p. 349.

The anvil-stones have one or more pits on the upper and lower surfaces and sometimes on the sides. One variety is a pebble bearing a large number of these pits on one surface. Anvil-stones are from about 5 to 20 cm. in diameter or length. The pits are formed by percussion, usually by the pointed or conical end of a nucleus placed in the

pit as a firm base for knapping flakes. Some anvil-stones bear only a few scratches, and the pits vary from the shallowest indentations to deep, steep-sided hollows.



Figures 316-317. Millstones.

316. (Top) Trimmed slab with all-over depression, Murtee Station, Wilcannia district, western N. S. Wales. 317. (Below) Pecked slab, elliptical in shape, with two narrow grooves on one surface. Central Queensland.

After McCarthy, 1941*c*, p. 330.

G. C. Clutton, photo. 0·2 nat. size.

ABRADING STONES. (Figs. 301, 308, 310–311, 313, 316 323.)

Millstones and Mullers. Referred to as grinding-stones, unless otherwise stated, in the list of references.

1878. Grindstones and hand-stones, Smyth, Vol. I, pp. 382-3, fig. 218.
1881. Dawson, p. 15.
1890. Mullers and slab, Edge-Partington and Heape, Vol. I, pl. 363, figs. 8-9; pl. 364, fig. 13.
1896. Nether or bed stone and hand-stones, Stirling, pp. 99-100.
1897. Slab or movable stone, Roth, sects. 154-5, 106, figs. 216, 242; millstones, Worsnop, p. 81, pp. 97-9, pl. 40.
1898. Browne, p. 234; mullers and slab, Edge-Partington and Heape, Vol. III, pl. 143, figs. 8-9.
1901. Kerns, mills or nether stones, muller-shaped upper-stones, Kenyon and Stirling, pp. 196-7; nether and upper stones, Spencer, pp. 82-3.
1903. Mills and grinders, Clement, p. 7, pl. ii, fig. 14.
1904. Slab and rubber, Roth, sect. 45, figs. 184-6.
1906. Thomas, p. 50.
1909. Mills, Daley, pp. 500-1.
1914. Kerns or mills and mullers, Kenyon and Mahony, p. 9; Spencer (pecked millstone), *B*, p. 77, fig. 26.
1915. Breton, p. 25.
1916. Millstones and upper stones, Glauert, p. 44.

1921. Grinders or pounders, upper and lower, Horne, *A*, p. 13, figs. 59-61; millstones, Pulleine, p. 279.
1922. Kerns or mills and mullers, Spencer, pp. 76-7, 87-9.
1924. Slab and rubber, nether-stone and top-grinder, Horne and Aiston, pp. 53-6, figs. 43-4, 91, 100.
1925. Basedow, *B*, pp. 360-1; Bolam, p. 83; Spencer, p. 32.
1927. Upper and lower grinding stones, Kenyon, p. 285.
1928. Nardoo mills (some pecked), Spencer, Vol. II, pp. 34, 497-8, figs. 34-5, 339.
1930. Millstones, Hale and Tindale, pp. 158, 171, 173.
1932. Upper and lower grinders, Cobb, *A*, pp. 85-6.
1933. Nether and upper millstones, Hale and Tindale, pp. 130-2, figs. 165-6; nether and upper grinders, Cobb, pp. 163-5; Talgarno mill, Mahony and others, p. 1340.
1934. Mills or kerns, Anonymous, p. 171.
1936. Millstone used on other implements, Casey, p. 93; grindstones, Thomson, p. 74.
1937. Enright, p. 91.
1939. Grinding and pounding stones, Jackson, pp. 290, 294-5.
1938. Millstones and mullers, McCarthy, pp. 39-40.
1940. Millstones and mullers, McCarthy, *A*, p. 34; *B*, pp. 245, 262, 268.
1941. Millstones and mullers, McCarthy, *C*, pp. 330-2, figure; Mitchell, p. 373; Mountford, p. 312.
1943. Polyhedral implements, grinding slabs and milling slabs, Campbell and Noone, p. 383; upper millstone and grindstone (Pejark Swamp), Mahony, pp. 39-40, pl. iii, figs. 1-2; millstones (including pecked specimens), Towle, pp. 73, 75, pl. vi, figs. 2-3.

Millstones (Figs. 316–323).—Usually made from quarried slabs of sandstone but some of the smaller examples are made from suitable pebbles. Quartzite, schist, and dark igneous stones sometimes form the material utilized. The grinding depressions are of two kinds; one is an all-over depression (Fig. 316) which occupies the whole of the surface, the other is a narrow groove (Fig. 317). The number of grinding depressions is variable, and millstones may bear an all-over depression on one or both surfaces, from one to four narrow depressions which are usually in pairs on each surface, or a combination of both kinds. There is sometimes an axe-sharpening groove on one surface.

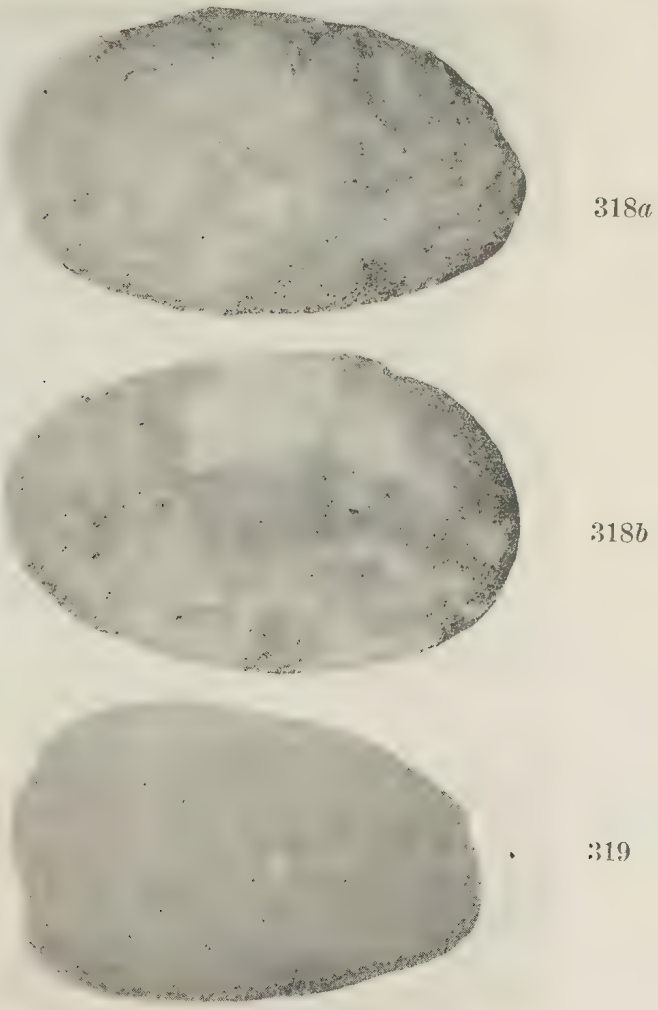
The trimmed slabs may be roughly shaped at the ends or right round the periphery, but in some areas the trimming is very neatly and carefully done (Fig. 316). The pecked millstones were dressed all over both surfaces, which are convex in the blanks (Fig. 318*b*) and are thus prepared for either use or trade. Local varieties of pecked millstones can be distinguished by shape, some being ellipsoid (Fig. 317), others oval (Fig. 316), ovate or pear-shaped in outline, but the distribution of these varieties is not yet known. The pecked type is limited to the interior of the continent, including far western New South Wales and Queensland. In size the millstones range from about 20 to 90 cm. in length.

Morah Millstone. (Fig. 319.)

1916. *Morah* slab, Hamlyn-Harris, pp. 104-5, pl. iv, figs. 1-2.
1941. *Morah* grindstones, Bramell, pp. 17-8; millstones with incised depressions, McCarthy, *C*, p. 331.

The *Morah* is a specialized millstone recorded from north-east Queensland and the Simpson Desert, Central Australia. It is distinguished by transverse and longitudinal incisions on the grinding depression. The Queensland specimens are all made from quarried slabs and are smaller on the average than other types of millstones. The example from the Simpson Desert is pecked.

Mullers (Figs. 301, 313, 320–322).—The mullers are generally round or oval in shape. They bear grinding faces on one or both surfaces, and there may be several grinding faces on the one surface. In the latter case the muller is frequently worn down into an angular implement with relatively sharp edges suitable for cutting and other uses (Figs. 313, 321). A pair of large mullers appeared to serve instead of the millstone and muller on occasions. Some mullers are thick pebbles worn down to a thin slab which is discarded, others are trimmed (Fig. 320) or pecked (Fig. 322) slabs. In size they range from about 7 to 21 cm. long, and most of them are oval in shape.



Figures 318-319. Millstones.

318*a*. Roughly trimmed slab prior to pecking. 318*b*. Pecked and unused millstone. Cooper's Creek, south-west Queensland. 319. *Morah* millstone showing incised lines across all-over depression. Slate, cast only. North-east Queensland.

G. C. Clutton, photo. 0·2 nat. size.

Whetstones. (Fig. 323.)

1878. Sharpening stones, Smyth, Vol. I, pp. 383-5, fig. 219.
1886. Sharpening stones, Macpherson, pp. 113, 116, fig. 6.
1895. Whetstones, Mathews, pp. 303-4.
1901. Grinding or whetting stones, Kenyon and Stirling, p. 197; whetstones, Spencer, p. 83.
1909. Sharpening stones, Daley, p. 501.
1914. Hones, Kenyon and Mahony, p. 9.
1921. Polishers, Horne, *A*, pp. 64-5.
1922. Whetstones, Spencer, p. 77.
1925. Grindstones, Basedow, *B*, pp. 365-6.
1938. Axe-grinding stones, McCarthy, p. 39.
1939. Axe-sharpening stones, Croll, fig. 1.
1940. Axe-grinding stones, McCarthy, *A*, p. 34; sharpening stones, Mitchell, p. 184, pl. xvi, figs. 1-4.
1941. Axe-sharpening stone, McCarthy, *C*, p. 333, figure.

The whetstones are made from pebbles or from slabs which are either trimmed or pecked into the required shape. Some are irregular lumps of stone, but most of them are rounded or oval, and they are often neatly shaped. The grinding groove

Figures 320-323. Abrading Stones, N. S. Wales.

320. Trimmed muller. Lake Narran. 321. Remnant of muller showing a number of grinding faces. Bourke. 322. Pecked discoid muller. Broken Hill. 323. Whetstone. Black Springs. After McCarthy, 1941c, *p.* 331.

G. C. Clutton, photo. 0·2 nat. size.

is usually at one end and may extend the full length of the whetstone, and some specimens are grooved on both surfaces. Their principal use is for grinding and re-sharpening the blades of axe and adze-heads, and of scraper-knives and chisels. In size the whestones range from about 7 to 30 cm. in length.

Bone-polishing stones. (Figs. 356-360.)

1941. Incised stones, Bramell, pp. 17-8, pl. iii, figs. 1-4.
1944. Slab showing grooves, Towle, pp. 189-90, figure.

This type of abrading stone consists of either a pebble or a lump of sandstone, shale, quartzite, or other suitable stone, bearing long narrow grooves used for shaping and sharpening bone implements such as *madvk* spear-barbs and points, awls, and death-pointers. It should be noted that these polishing-stones were probably also used for shaping wooden spear-barbs. Bone-polishing stones range from 7 to 15 cm. long. They occur on the coast of New South Wales but their general distribution is not known.

Smoothing stones. Referred to as rasps, unless otherwise stated, in the list of references.

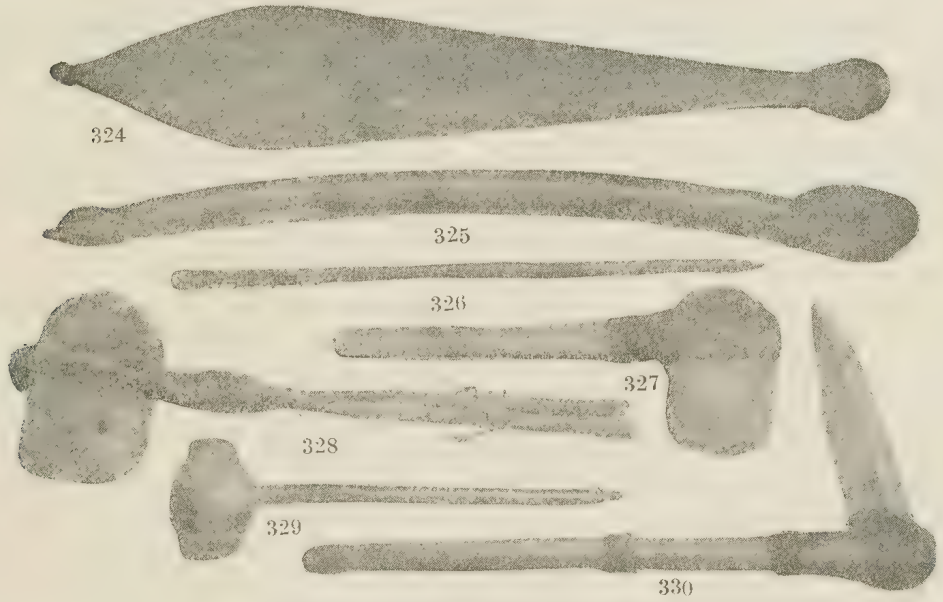
1878. Smyth, Vol. I, p. 384, fig. 220.
1881. Dawson, p. 24.
1901. Spencer, pp. 79, 83.
1907. Etheridge and Whitelegge, p. 249, pl. xlii, group 1, figs. 10-11.
1914. Kenyon and Mahony, p. 9.
1921. Polishers, Horne, *A*, p. 13, fig. 65.
1924. Horne and Aiston, pp. 56, 91, 93-4, fig. 68.
1925. Basedow, *B*, p. 362; Hale and Tindale, p. 95, fig. 41, *b-c*.
1928. Burnisher or rasp, Hall, p. 259.
1941. McCarthy, *C*, p. 333.

The smoothing stones consist of pebbles or lumps of stone, principally sandstone, used for finishing off the surfaces of wooden weapons and other articles, and their use is thus incorrectly referred to as rasping which roughens a surface so treated. The mullers are frequently used as smoothing stones, and no specialized types are known.

Fish-hook files. (Figs. 310–311.)

1889. Pointed implement, David and Etheridge, p. 144, pl. xx, fig. 3.
1900. *Dipoonga* or fish-hook file, Enright, pp. 111, 116, pl. iii, fig. 14.
1904. Coral pencil, Roth, sect. 68.
1931. Leaf-shaped implements, Rolfe, pp. 61-2.
1932. Fish-hook files, Thorpe, *A*, p. 78; *B*, pp. 307, 309, pl. xxxii, figs. 1-18.
1933. *Dipoonga*, Thorpe, *B*, addenda.
1934. Rasp, Kennedy, E., *A*, pp. 200-1; *Dipoonga*, Turner, *A*, pp. 227-8, 253.
1937. *Dipoonga*, Enright, p. 89.
1940. Fish-hook files, McCarthy, *B*, p. 269.
1943. Fish-hook files, McCarthy, *A*, p. 151.

The fish-hook files are made of sandstone, quartzite, granite, or coral limestone. There are two types, the triangular form (Fig. 310), with a broad butt, and the cylindrical form (Fig. 311), with a more or less uniform diameter. They were used for shaping shell fish-hooks along the east coast of Australia, but they may be more widely distributed. In 1900 Enright recorded the name *Dipoonga* for the fish-hook file at Port Stephens, New South Wales, and Turner (1934, *A*) subsequently proposed it as a general name for the implement, but in 1937 Enright stated that he had made an error in giving this name to the fish-hook file because it was the name of a ceremonial object. The name, therefore, cannot be adopted for the fish-hook file, and the latter term is quite suitable. These files are from about 4 to 15 cm. long. Thorpe (1932, *B*) has given a general description of them.



Figures 324-330. Hafted Implements.

324. Spear-thrower with adze-flake hafted in gum at grip end. Western Kimberleys, Western Australia. 325. Hafted implement with *tula* adze-flake at one end and slug adze-flake at other end, both hafted in gum. Central Australia. 327. Hafted hammerstone, with handle. Palmer River, Cape York, Queensland. 328. Hafted edge-ground axe, with handle. Kangaroo Creek, Clarence River, N. S. Wales, 326. *Taap* saw-knife, south-west Australia. 329. *Kodja* hammer-axe, south-west Australia. 330. *Leilira* blade hafted as fighting pick, Arnhem Land.
G. C. Clutton, photo. 0·2 nat. size.

Combined Percussion and Abrading Stones.

Mortars (Fig. 315).—Referred to as pounding stones, unless otherwise stated, in the list of references.

1878. Smyth, Vol. I, pp. 382-3, 385.
1881. Mortar and pestle, Dawson, pp. 24-5.
1886. Macpherson, pp. 113, 116.
1894. Mills, Ferguson, p. 88.

1895. Millstones and pounders, Mathews, p. 305.
1897. Nardoo stone, Roth, sect. 155.
1901. Nether stones and pounders, Kenyon and Stirling, pp. 196-7; Spencer, pp. 82-3.
1903. Mortar and pestle, Roth, p. 62.
1904. Petrie, pp. 92-3; pounders or Nardoo-stone, Roth, sect. 36, fig. 150.
1914. Small mills and pestles, Kenyon and Mahony, pp. 9, 12; hammer and upper millstone, Kenyon and Mahony, p. 4; lower and upper pounding implements, Spencer, *B*, p. 77.
1919. White, p. 80.
1921. Upper and lower pounders, Horne, *A*, p. 13, figs. 59-61; mortar, Horne, *B*, p. 52; Pulleine, p. 279.
1922. Spencer, pp. 76-7, 88.
1924. Pounding and crushing stones, Horne and Aiston, pp. 53, 100, fig. 43.
1925. Spencer, p. 32.
1927. Kenyon, pp. 281, 285.
1928. Nardoo mills, Thorpe, p. 248, pl. xxvi, figs. 1-2.
1932. Kennedy, K., *A*, pp. 106-9.
1931-2. Pounders and hammers, Thorpe, p. 79.
1934. Pestles and pounding stones, Anonymous, p. 171; anvils, Howchin, pp. 73-4, fig. 131.
1937. Mortar, Casey, p. 70.
1939. Moss, p. 165; Jackson, p. 290.
1938. Mortars and pestles, McCarthy, pp. 39-40.
1940. Mortars and pestles, McCarthy, *A*, p. 31; *B*, pp. 262, 268.
1941. Mortars (pebble, trimmed coroid, pecked), McCarthy, *C*, pp. 329-30, 332, figure; mortar, Tindale and Birdsell, p. 8.
1943. Mortars and pestles, McCarthy and Davidson, p. 228.

The mortars are made from pebbles or from lumps of stone which are either trimmed or pecked into the required shape. Most of them are rounded or oval in shape. The mortar depression may occur on one or both of the upper and lower surfaces, and there is frequently an anvil-pit in the middle of the depression. Some mortars have grinding surfaces on the margins also. In size the mortars range from about 7 to 26 cm. in diameter or length.

Percussion-mullers (Fig. 301).—These implements are percussion stones employed in addition as mullers on one or both of the upper and lower surfaces. The *kulki* percussion stone frequently bears signs of rubbing as a muller on the upper or lower surface, or on both.

Rock Engraving Stone (Fig. 308).—A unique specimen, previously undescribed, in the collection of the Australian Museum, is a quadrangular lump of basalt, with a weathered surface, found on Mangrove Mountain, about seventy miles west of Sydney, New South Wales, by Mr. R. McKenzie. It bears three rounded edges, which are smoothed and striated, used for abrading purposes. It was picked up on a sandstone rock surface on which there are engravings of an emu and other small figures, some unfinished, and the rounded edges would fit into many of the grooved outlines of engravings in this area. It is considered probable, therefore, that the use of these edges was for rubbing the grooved outlines. Furthermore, one end is incurved due to percussive use, and the adjoining corner of the implement is chipped to a rounded edge with which the punctured outlines common among the engravings could be made. The implement is 10 cm. long, 9·5 cm. wide, and 4·5 cm. thick. This is the only implement yet found which can be said with any degree of probability to have been used for the making of the rock engravings in the Sydney–Hawkesbury River district.

RITUAL IMPLEMENTS.

Cylindro-conical Stones. (Figs. 331–340.)

Referred to as cylindro-conical stones, unless otherwise stated, in the list of references.

1884. Stone implement, Gilliat, p. 946; conical stone, Macleay, pp. 507-8.
1887. Rudely carved stone implement, Bennett, p. 3.
1897. Carrot-shaped stones, Wornsop, p. 113.
1898. Tribal debt, phallic stones and pounders, Edge-Partington and Heape, Vol. III, pls. Palmer River, Cape York, Queensland. 327. Hafted edge-ground axe, with handle. Kangaroo stones, MacRitchie, p. 169, figs. 1-2.
1899. Churinga of phallic shape, Spencer and Gillen, p. 150.

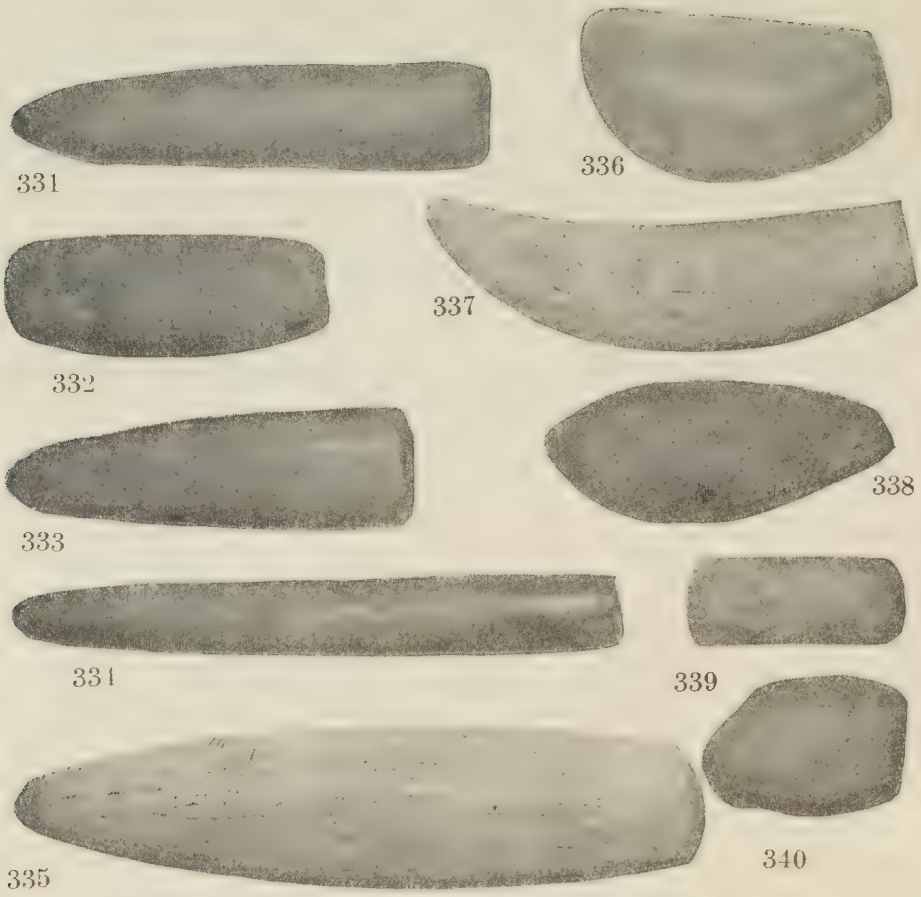
1901. Carrot-shaped stones, Kenyon and Stirling, p. 193; stones of A-type, Officer, pp. 239-41.
1902. Engraved stones, death-stones, Richards, p. 182.
1903. Horn record stone, Freeman, p. 539.
1904. Churinga, Long, No. 55.
1906. Conical piece, Gregory, pp. 79-80; Thomas, p. 199.
1908. Eylmann, pl. xxxi, fig. 10.
1909. Curious stones, Mathews, *A*, pp. 493-8; ceremonial stones, Mathews, *B*, pp. 1-7, figs. 1-12; *C*, pp. 460-2, figs. 1-2.
1912. Magical stones, Mathews, pp. 359-64, pl. xv.
1916. Cylindro-conical and cornute stones, Etheridge, pp. 1-41, pls. i-ix, map.
1918. Etheridge, p. 57.
1922. Cylindro-conical and cornute stones, Pulleine, pp. 304-8, pl. xiv; Spencer, pp. 89-94.
1923. Cylindro-conical and cornute stones, Horne, pp. 137-42; MacGillivray, pp. 68-9.
1924. Horne and Aiston, pp. 163-72.
1925. Basedow, *B*, pp. 255, 289-90.
1926. Kenyon, Mahony and Mann, pp. 471-4; Pulleine, p. 179; Tindale and Mountford, pp. 156-9, figs. 1-2.
1928. Mathews, p. 534.
1929. Aiston, pp. 130-1; Dart, pp. 553-62, figures; Kenyon and Barrett, p. 20.
1932. Cobb, *A*, pp. 85-6; Dart and Hartnell, pp. 731-41.
1933. Unusual stone, Stuart-Dove, pp. 20-1, pl. iii.
1935. Aiston, p. 5; Mountford, p. 212.
1936. Goddard, pp. 25-7, figure.
1938. Dow, pp. 102, 129; McCarthy, p. 40.
1939. Croll, p. 14, figs. 4-5; Enright, p. 192; Mountford, p. 159, pl. S, fig. F.
1940. McCarthy, *B*, pp. 251, 265.
1941. Black, pp. 33-4; Hossfeld, pp. 69-70; McCarthy, *D*, pp. 367-8, figure; Tindale, *C*, p. 70.
1943. Cylcons, Black, pp. 1-104, figs. 1-115, maps 1-2; Noone, *A*, p. 280.
1944. Dunbar, pp. 145-6; McCarthy, *A*, pp. 257-60, pl. xv; Noone, p. 144.

The four principal kinds, according to Kenyon, Mahony, and Mann (1926), who were followed by Black (1943), are as follow:

i. Cylindrical: Straight and cylindrical for the greater part of their length, tapering to a sharp or blunt point, and usually taper slightly towards the base (Figs. 331–332, 334–335).
ii. Conical: Almost always straight and cone-shaped, being broader at the base than the cylindrical kind (Fig. 333).
iii. Cornute: Horn-shaped (Fig. 337).
iv. Phacoid: Bean-shaped (Fig. 336).

The cylindro-conical stones are made out of a number of materials, including clay, argillaceous sandstone, hard sandstone, quartzite, basalt, and slate. The shaping processes employed are chiefly pecking and grinding, although percussion-trimming occasionally appears. Their characteristics are variable and for this reason are not suitable for classification purposes. They have either a plain or an incised surface, the motives embracing various combinations of straight transverse and longitudinal lines, bird-tracks, simple pittings, the herring-bone, cross, apical ring, median encircling or circumferential ring, spiral, stellate, barred circle, crescent or boomerang shape, kangaroo-tracks, oval, and an M-like figure. These motives occur in innumerable combinations but in only one design, a "laced" pattern, is there any standardization. The transverse section of the cylindro-conical stones is round or oval and is often flattened oval. The base may be cupped, plain or rounded, and the distal end may be pointed, rounded or bladed. Broken examples, repaired in some instances for further use, form a truncated variety (Fig. 339). A mortar depression occurs on the side of a very small number of specimens.

One of the most puzzling features of these stones is that the great majority of them, in all materials, bear irregular flake-scars round the base, and the cause of this haphazard knapping is unknown. It is interesting to note, however, that in Central Australia, when an old man is ill, he will sometimes scrape off some of the edge of his stone *tjuringa*, mix the dust with water, and drink the potion for strengthening purposes, the idea being to absorb some of the essence of the stone, as it is endowed with the attributes of the individual it represents (Spencer and Gillen, 1927, Vol. I, pp. 133–4). This custom suggests the possibility that the flakes struck off the butt of



Figs. 331-340. Cylindro-Conical Stones

331. Cylindrical, pecked, igneous rock, Momba Station, western N. S. Wales. 332. Cylindrical, bladed, mortar depression on one surface, igneous rock, Wilcannia, western N. S. Wales. 333. Conical, slate. Popilta, Avoca Holding, western N. S. Wales. 334. Cylindrical, slate. Western N. S. Wales. 335. Cylindrical, rounded butt. Incised markings denoted with ink. Argillaceous sandstone. Western N. S. Wales. 336. Phacoid, argillaceous sandstone. Budda Station, western N. S. Wales. 337. Cornute, incised markings denoted with ink. Argillaceous sandstone. Western N. S. Wales. 338. *Bogan*-type conical stone or pick. Granite. Grong Grong, N. S Wales. 339. Re-used portoin of cylindrical stone. Both ends are rounded and trimmed, one bears percussion marks. Avoca Station, western N. S. Wales. 340. Short, squat, phacoid stone of natural shape, with polished flat butt. Western N. S. Wales.

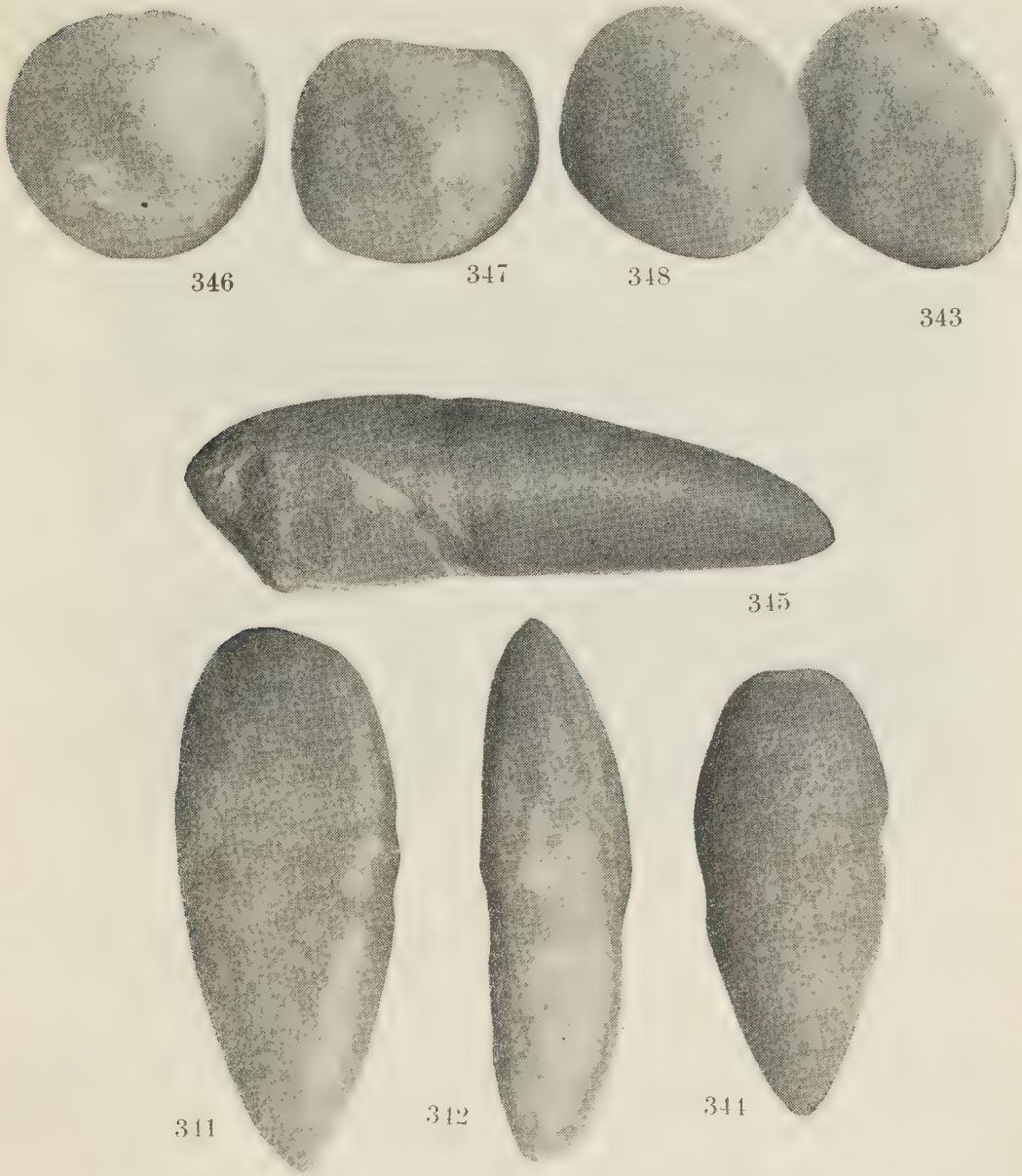
G. C. Clutton, photo. 0·2 nat. size.

the cylindro-conical stones were used for magical and medicinal purposes. The general consensus of opinion is that the cylindro-conical stones are of ceremonial or ritual significance, somewhat similar to that of the *tjuringa* of Central Australia.

The cylindro-conical stones occur in greatest abundance in far western New South Wales, but they have been found in eastern New South Wales, Queensland, South and Central Australia, and in the Northern Territory, including Melville Island. They are up to about 83 cm. long and from 5 to 12 cm. in diameter.

TJURINGA. (Fig. 349.)

1896. Gillen, pp. 179-80, pl. vii.
1898. Edge-Partington and Heape, Vol. III, pls. 117-9.
1899. Spencer and Gillen, pp. 129-66, fig. 21.
1901. Spencer, pp. 56-61, 67, figs. 124-8.
1904. Spencer and Gillen, pp. 257-82, 729-37, figs. 87-9, 92, 296, 299-300, 303, 306.
1908. Eylmann, pp. 428-9, pl. xxx, fig. 8; xxxi, 1-3.
1922. Spencer, pp. 103-13, pl. 21



Figs. 311-348. Grooved Conical Stones and Picks, N. S. Wales.

341. Two transverse grooves, with mortar depression on one surface. Pecked. The Springs, Dubbo. 342-343. Polished, with adze-blade at one end. Single groove. Gundary, Goulburn district. 344. Pecked. Single groove. Bogan Gate, N. S. Wales. 345-346. Cornute, single groove, pecked. Wulla Wullah, Lachlan River, N. S. Wales. 347-8. Pointed distal ends of two specimens.

After McCarthy, 1939*A*. Plate T.

G. C. Clutton, photo. 0·25 nat. size.

1928. Mathews, J., pp. 534-5.
1927. Spencer and Gillen, Vol. I, pp. 99-144, figs. 37-39.
1928. Spencer, Vol. I, pp. 272-307.
1937. Davidson, pp. 91-104, figs. 68-73.
1938. McCarthy, *A*, p. 45.
1940. McCarthy, *B*, p. 252.
1941. McCarthy, *D*, p. 367, figure; Mountford and Walsh, pp. 113-5, figs. 1-2.
1943. Noone, *A*, p. 280.

Tjuringa are made by trimming the margins and grinding the surfaces of a flat slab of micaceous stone to a circular, oval, or pear-like shape. They are usually rubbed all over with red ochre, or with charcoal in some instances. Most of them bear engraved or painted markings of a geometric kind, comprising spirals, concentric circles and half-circles, meandering lines, dots, rows of chippings, and, in addition, tracks of birds and marsupials. One pecked conical example has been described by Mountford and Walsh (1943). In size the stone ones range from 2·5 to 90 cm. long, and they are usually from 1 to 2·5 cm. thick.

Fig. 349, *Tjuringa* sacred stones, Central Australia.

The largest specimen represents the Honey Ant or Yarumpa totem, the medium-sized one the Yalka Bulb totem, while the totem of the smallest example is not known. Arunta tribe.

After McCarthy, 1941*D*, p. 366.

G. C. Clutton, photo. 0·5 nat. size.

The main function of *tjuringa* in the religious life of the Central Australian tribes is that of an abode of the spirit of their owner, or of the species which is his or her totem, and they are extremely sacred objects. Several varieties are not associated with the idea of spirit individuals, and represent the eggs of totems, some weapon or other object carried about by a culture-hero, the top-knot of an ancestor's hair, the liver or part of the body of a man or animal, lumps of honey, and many other things. The stone *tjuringa*, with which this work is concerned, are more limited in function than the wooden ones. The older an example the greater is it valued, and according to legend all original *tjuringa* were made of stone. Some of the stone ones are bored at one end, apparently for the purpose of being hung on sacred *nurtunja* and other paraphernalia during ceremonies. The stone *tjuringa* were not used as bullroarers.

The most satisfactory method of classifying *tjuringa* appears to be according to the totem because each totemic clan has a distinctive arrangement of the decorative motives, and a further subdivision may be made according to function. The name is spelt variously as *churinga*, *tjurunga*, and *tjuringa*, and the latter is adopted here. It is the name of these ritual stones in the language of the Aranda tribe of Central Australia.

Sundry Engraved Stones. (Fig. 352–355.)

Referred to as incised or engraved stones, unless otherwise stated, in the list of references.

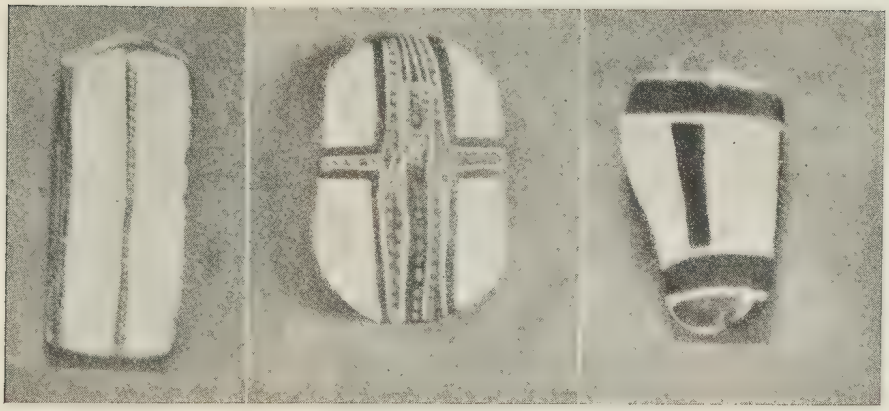


Fig. 350. *Muraian* sacred stones.

These painted stones are used by the natives of north-west Arnhem Land for totemic increase rites and in initiation ceremonies.

After Spencer, 1922, Pl. 19.

Nat. size.

1928. Thorpe, p. 247, pl. xxv, fig. 5.
1936. McCarthy, *A*, pp. 23-4, figure.
1938. Mountford, pp. 144-6, figs. A-G; McCarthy, *A*, p. 40.
1940. McCarthy, *A*, p. 34; Mountford, p. 336, figs. A-D.
1941. Bramell, p. 18, pl. iii, figs. 7-10; McCarthy, *D*, p. 369, figure.
1944. Hammer-dressed pebble, McCarthy, *C*, p. 264, pl. xvii, fig. 8; *C*, p. 264.

Most of these artefacts are pebbles or pieces of stone on which are incised figures of animals, geometric designs, or arrangements of straight and nondescript lines. Their significance is unknown, and they vary greatly in size. The varieties comprise (*a*) (Figs. 352–353), small pebbles bearing incised figures of animals, from the Liverpool district, New South Wales, and probably of totemic significance, (*b*) (Figs. 355, 369–371) pieces of stone and pebbles bearing incised straight lines of various lengths and arrangements, considered to be message-stones.

Painted Stones: Muraian. (Fig. 350.)

1914. Spencer, pp. 224-227, 428, 190, pl. vii.
1922. Spencer, pp. 99-101, pl. 19.

The *Muraian* are natural pebbles or lumps of stone on which are painted geometrical and naturalistic designs of totemic and sacred significance. They represent, for the most part, either yams or the eggs of totemic animals. They are handed down from generation to generation. They were used by the tribes of north-western Arnhem Land.

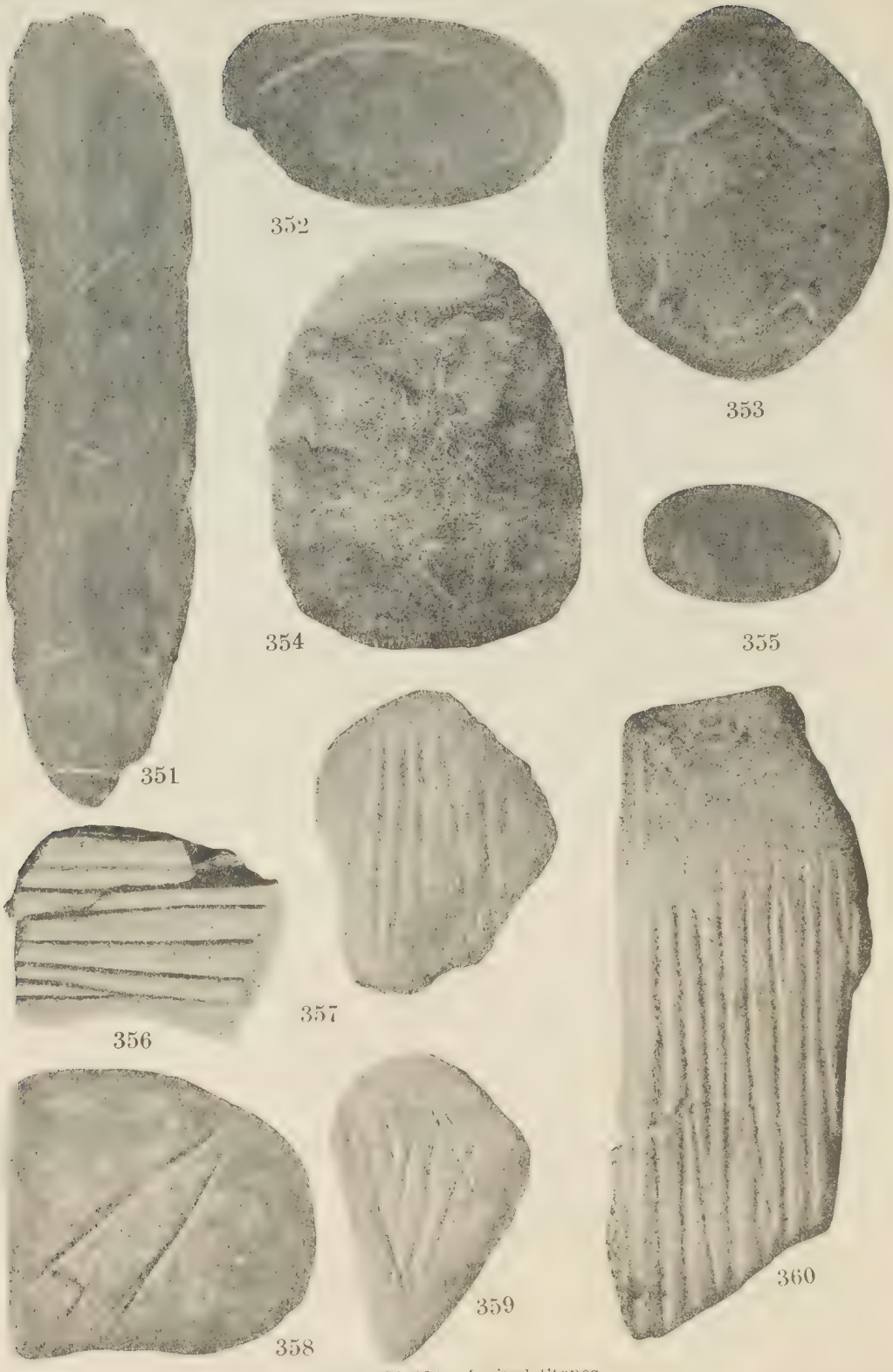
Sundry painted stones of ceremonial importance occur elsewhere.

Phallic Stones. (Figs. 351, 361–368.)

Referred to as phallic stones, unless otherwise stated, in the list of references.

1899. Churinga of phallic shape, Spencer and Gillen, p. 150.
1921. Campbell, p. 90, fig. 1, and pl. K.
1923. Mjöberg, 1923, pp. 86-8, pl. 2.
1925. Basedow, *B*, pp. 255-6, 282-92, fig. 7.
1928. Mathews, J., p. 534.
1934. Enright, p. 203, figure.
1938. Phallomorphs, Davidson, pp. 66, 68-9.
1939. Mountford, pp. 158-61, pl. S.
1941. Incised stone, Bramell, p. 18, pl. iii, fig. 6; McCarthy, *D*, p. 369.

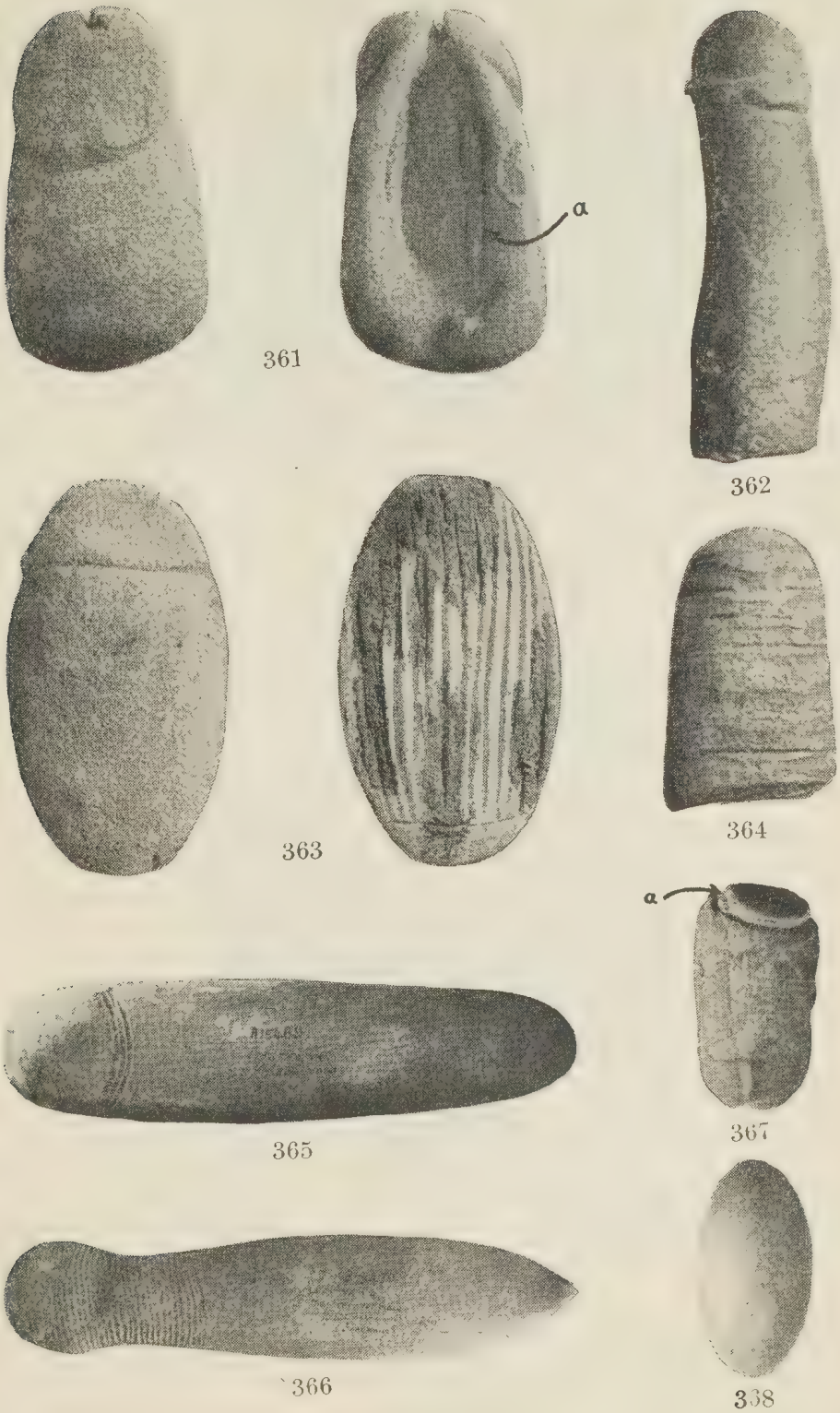
The four major types of phallic stones are fashioned in the form of (*a*) (Figs. 351, 362, 365, 367), a circumcised male organ, (*b*) (Figs. 361, 363) a circumcised and subincised male organ, (*c*) in the form of or to represent a female organ, and (*d*) (Figs. 368) natural stones, the sexual organs of spiritual ancestors. Some bear engraved designs or lines. They vary in size, and those of the (*a*) and (*b*) types may be cylindrical or flat. They are from about 7 to 20 cm. long.



Figs. 351-360. Incised Stones.

351. Phallic stone showing circumcision ring, and other incised markings. Locality unknown. 352-353. Pebbles bearing incised figures of a tortoise and an indeterminate creature. Liverpool, near Sydney, N. S. Wales. 354. Trimmed coroid edge-ground axe of lenticular section bearing a fish on one side and a boomerang on the other side. Tingha, N. S. Wales. 355. Small red pebble bearing a concentric oval on one side, and a 20-rayed "sun" figure on the other side. Maroubra, N. S. Wales. 356-359. Bone-polishing stones, Boat Harbour, N. S. Wales. 360. Bone-polishing stone (?), The Springs, Dubbo district, N. S. Wales.

After Bramell, 1941, Pl. iii. G. C. Clutton, photo. 0·75 nat. size.



Figs. 361-368. Phallic Stones.

361. Circumcised and subincised type. Ferruginous sandstone. North-west Australia. 362. Natural stone resembling circumcised penis. North-west Australia. 363. Circumcised and subincised type (?), north-west Australia. 364. Phallic stone. McDonnell Ranges, Central Australia. 365. Circumcised type, *Luritja* tribe, Central Australia. 366. A symbolical phallic stone associated with 365. 367. Natural stone resembling circumcised penis. McDonnell Ranges, Central Australia. 368. Natural pebble representing penis of an ancestor of the Aranda Tribe, Central Australia. After Mountford, 1939, Pl. S.

0·25-0·75 nat. size.

The principal function of these phallic stones is in the instruction of the young men in sexual matters, both in their own life and in that of the spiritual ancestors, and the demonstration to them of the operations concerned, during initiation ceremonies.

MAGIC STONES. (Figs. 372–374.)

1878. Magic stones, Smyth, Vol. I, p. 386.
1890. Charmed and magic stones, Edge-Partington and Heape, Vol. I, pl. 361, Nos. 9-10; teyl or talismanic stone, Etheridge, pp. 370-1.
1891. Teyl or talismanic stone, Etheridge, pp. 39-40, pl. viii, figs. 4-6.
1898. Charmed and magic stones, Edge-Partington and Heape, Vol. III, pl. 141, Nos. 7-8; pl. 143, Nos. 20-1.
1901. Sacred stones, Spencer, pp. 58-60.
1903. Rain-making stones, Clement, p. 6, figure; magic pebbles and quartz crystals, hunting charms, Roth, sects. 110-1, 116-42, figs. 14-5, 17-8, 149*e-f*.
1908. Painted stone, Eylmann, pl. xxxiii, fig. 5.
1922. Sacred stones, Spencer, pp. 103-13, pl. 21.
1923. Rain-making stone, MacGillivray, p. 69.
1927. Gizzard stones, Kenyon, p. 281; magic stones, Spencer and Gillen, Vol. II, chs. xv-xix.
1928. Magic stones, Mathews, J., p. 534.
1929. Aerolites or "Emu's Eyes", Aiston, pl. xxviii.
1931. *Muckera* stone, Goddard, pp. 65-6.
1934. Magic stones, Davidson, p. 159; magic stones and charms, Howchin, pp. 77-8, 83-5.
1938. Magic stones, Elkin, pp. 170-2, 201, 216, 222-5.
1940. Magical and ritual stones, McCarthy, *B*, p. 264.
1941. Magical stones, Berndt and Vogelsang, pp. 369-80; McCarthy,*D*, pp. 369-70, figure.

The two principal types of magical stones are (*a*) (Figs. 372–373) those made of mineral crystals such as quartz, calcite, and gypsum, sometimes shaped into rounded plates and other forms, and (*b*) (Fig. 374) small, shiny pebbles, Australites or obsidian bombs, red and yellow stones, and banded pebbles. Examples of both types are used for rain-making, hunting, sorcery, causing and curing sickness, and other purposes.

Figs. 369-371. Incised Stones, South Australia.

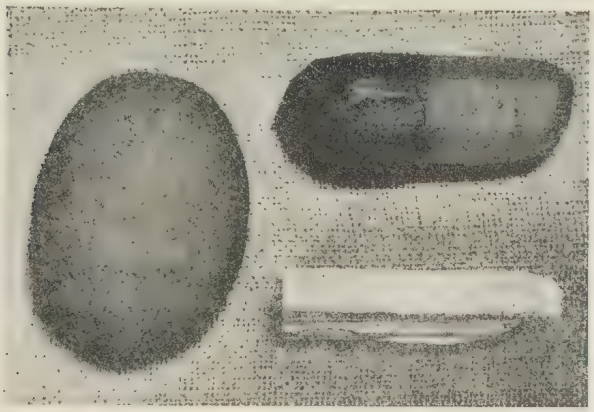
369. First Waters, Oratunga. 370. Holowalina Station. 371. Kanyaka Creek, Gordon district. After Mountford, 1938, p. 145.

0·75 nat. size.

LEGENDARY STONES. (Fig. 375.)

1901. Spencer, p. 58.
1914. Totemic *muraiian* stones, Spencer, *A*, pp. 224-7, pl. vii.
1922. *Maraiian* stones, Spencer, pp. 99-101, pl. 19.
1927. Churinga, Spencer and Gillen, Vol. I, ch. vi.
1937. Legendary stones, Enright, pp. 88-89, fig. 1.
1938. Sacred stones, Elkin, pp. 170-2.
1941. Legend stones, McCarthy, *D*, p. 369, figure.

These artefacts are usually natural stones whose shape suggests a mythical origin to the aborigines. They are used in totemic, initiation, historical, burial or other ceremonies, or may be the property of an individual and function as a charm. They usually represent some object or animal, frequently because of a similarity in shape.



Figs. 372-374. Magic Stones.

372. Piece of gypsum used in rain-making rites. Mt. Poole, N. S. Wales. 373. Quartz crystal, gum grip. Cairns district, Queensland. 374. Pebble coloured with red ochre. Lake Eyre, Central Australia.

After McCarthy, 1941*D*, p. 370.

G. C. Clutton, photo. 0·5 nat. size.

Fig. 375. Legendary Stones, N. S. Wales.

Two examples of natural pebbles with which myths are associated by the Kumbaingeri Tribe, Macleay River. On the left is the brown snake stone, and on the right the moon stone.

After Enright, 1937, p. 89.

G. C. Clutton, photo. 0·5 nat. size.

MISCELLANEOUS IMPLEMENTS.

Hunting and Domestic.

Basket-weights.

1878. Smyth, Vol. I, pp. 385-6.
1901. Basket stones, Kenyon and Stirling, table; stone weights, Spencer, p. 83.
1914. Basket stones, Kenyon and Mahony, p. 10.
1915. Basket-weaving stones, Breton, p. 25.
1922. Stone weights, Spencer, p. 88.
1934. Basket stones, Anonymous, p. 171.

Basket-weights are natural pebbles of various sizes around which the base of a basket or bag is shaped. Their use facilitates the shaping of the sides.

Fire-making stones.

1904. Roth, Sect. 35, figs. 144-9.
1941. Mountford and Berndt, pp. 342-4, figs. A-B.

The above authors record the use of pieces of flint and iron pyrites by the Dieri tribe, and of flint and ironstone by the Adnjamatana tribe, in the central Australian region, to produce a spark in the making of fire. The only other record is that of Stokes (1846, Vol. I, p. 175), who stated that a native of Bathurst Island carried two pieces of quartz wrapped in bark tinder for the making of fire, but these crystals were probably of magical significance.

Sinkers and fishing-stones.

1878. Smyth, Vol. I, p. 389.
1901. Spencer, p. 69.
1924. Horne and Aiston, p. 100.

No description is given of the stone sinkers recorded to have been used at Lake Tyers, Victoria (Smyth, 1878). No other occurrence is known in Australia. Kenyon and Stirling (1901, table) record fishing-stones, but these were ordinary hammerstones struck together under water to cause the fish to rise to the surface or to drive them into a net.

Picks. (Figs. 338, 341–348.)

1864. Grooved axe, Anonymous, pp. 120-1, figure.
1904. Ballarat Implement, Gregory, p. 126.
1921. Picks, Horne, p. 12, figs. 50-1 (plain and grooved kinds).
1928. Doubly-grooved conical implement, Thorpe, p. 248, pl. xxvii, fig. 2.
1936. Kernbeile, Fürer-Haimendorff, pp. 23, 434.
1939. Grooved conical stones, McCarthy, *A*, p. 161-9, fig. 1, pl. T; conical stone, Moss, p. 165.
1940. Grooved conical stones, McCarthy, *B*, p. 251.
1941. Grooved conical stone, McCarthy, *E*, p. 19, pl. iv, fig. 2.
1943. Axe-like implement, Mahony, p. 41, fig. 6.
1944. *Bogan*-type, McCarthy, *A*, p. 259, pl. xv, fig. 4.

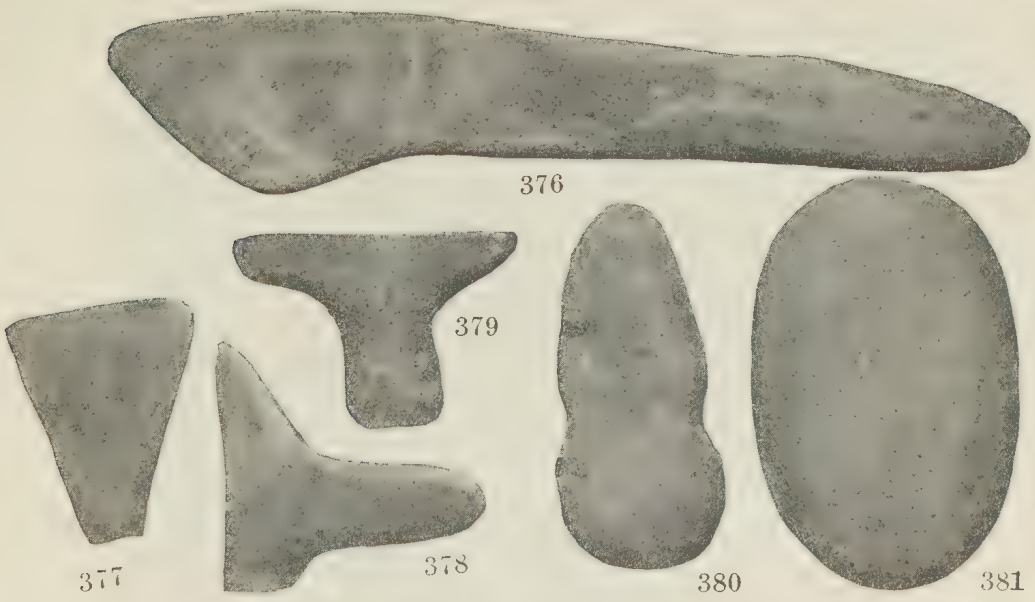
There are two types of picks, the plain and the grooved. Their function is not known, but many examples of each type bear a use-polished working edge. Their distribution is spasmodic and appears to be limited to the eastern portion of south-east Australia (*see* Addenda).

The *Bogan-pick* (Fig. 338) is ellipsoid in shape, tapering to a point or working edge at each end, or at one end. Each half is cone-shaped. The surface is pecked, and the transverse section is round or oval. Of the three examples known one, from east of Balan, Victoria, figured by Horne (1921, fig. 50), is pointed at one end and rounded on the butt; one from Grong Grong, N. S. Wales (McCarthy, 1944, p. 259, pl. xv, fig. 4) is elliptical but pointed at one end only; one from the Bogan River, New South Wales, has a conical point at each end, one formed by three facets and the other by four facets. They are from 18 to 23 cm. long, and up to 5 lb. in weight. The name *Bogan* is derived from the Bogan River, New South Wales, where one of the above specimens was found.

The grooved picks (Figs. 341–8) are straight, cylindrical or flattened in transverse section, with a pointed distal end, and a rounded or bladed butt. One or two marginal or encircling grooves occur in the middle of these picks. The surface immediately surrounding the point is polished by use. One polished specimen bears an adze-blade at one end and is conical and pointed at the other end. Several have mortar-like depressions between the groove and the point. One specimen bears three lightly incised lines. A number of them bear percussion marks on the point, and also on the butt. The surface is either pecked or polished, the latter process being done over pecking as a rule. In size they range from 20 to 31 cm. long, and up to 7 lb. in weight. They are made of heavy igneous or metamorphic rocks. McCarthy (1939) has given a general description of the known specimens, and discussed the relationships between the grooved picks and the cylindrical stones and other implements.

Tanged implements. (Figs. 377–379, 382–383.)

There are two types of tanged implements which, although somewhat similar to one another in possessing a tang, appear to have had entirely different functions. They are known respectively as the *wodda* and *mena* tanged implements.



Figs. 376-381. Ritual and Miscellaneous Implements.

376. Stone club. South Wambo, N. S. Wales. 377. *Mena*-type tanged implement. Russell River, Queensland. 378-379. *Mena*-type tanged implements from Mena Creek, Cairns district, Queensland. 380. Waisted hammerstone, Papua, probably traded from Cape York, Queensland. 381. Pebble bearing pecked design. Murramarang, N. S. Wales.

After McCarthy, 1944C, Pl. xvii, figs. 7-12.

G. C. Clutton, photo. 0·3 nat. size.

Yodda tanged implement. (Fig. 382.)

1898. Edge-Partington and Heape, Vol. III, pl. 142, figs. 8-9.
1908. Steinernes Werkzeug, Eylmann, p. 367, pl. xxii, fig. 10.
1934. Uncommon stone implement, Casey, pp. 94-9, pls. ix-xi.
1936. Bicycle-saddle implements, Casey, pp. 92-4, fig. 3.
1938. Tanged stone artefacts, McCarthy, *A*, p. 40.
1940. Tanged axe-like implements or bicycle-saddles, Casey, p. 27; tanged implements, McCarthy, *B*, p. 268.
1941. Tanged implements, McCarthy, pp. 370-2, figure.
1944. *Yodda*-type, McCarthy, p. 265.

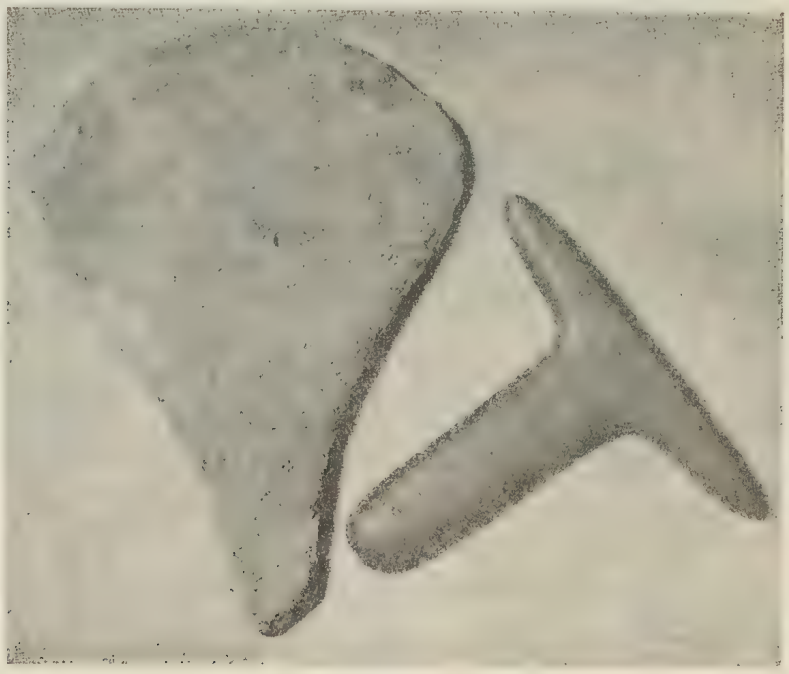
The distal end is curved, and may bear a trimmed and comparativey sharp biface edge, or a trimmed or polished and rounded but thin edge. The proximal end is tanged or attenuated and may be pointed, rounded or straight-edged. The transverse-section is usually lenticular. Most of the known specimens, which are comparatively few in number, are pecked, and some are polished over the pecking; one is a semi-biface being trimmed on both surfaces round the periphery, and several are trimmed bifaces which appear to be unfinished blanks. In size they range from 20 to 36 cm. long, and from 3 to 12 lb. in weight. Casey (1934) has given a general description of the known specimens. The name *Yodda* was proposed by McCarthy (1944, p. 265) and is the name of a valley in central Papua where the type was first recorded.

Mena tanged implements. (Figs. 377 379, 383.)

1936. Casey, pp. 90-1, figs. 1-4, pl. vii.
1941. T-shaped artefacts, McCarthy, *D*, pp. 370-2, figure.
1944. *Mena* implements, McCarthy, pp. 264-5, pl. xvii, figs. 9-11.

The distal end is flattened and often striated, and the proximal end tapers to a shaped tang, with either straight or oblique sides. The transverse section is lenticular or flattened oval. The surfaces may be (*a*) flaked, (*b*) pecked, or (*c*) polished, sometimes over pecking. Some examples have an edge-ground blade at the end of the tang, and some bear incised lines on various parts of their surfaces. In size the known specimens are about 15 cm. long and wide. Casey (1936) and McCarthy (1944) have given a

general description of the known specimens. The name *mena* was proposed by McCarthy, and is derived from Mena Creek, Cairns district, north-east Queensland, where most of the specimens have been collected by Mr. Kimlin, a local farmer.



382 383

Figs. 382-383. Tanged Implements.
382. *Yodda*-type, Oberon, N. S. Wales. 383. *Mena*-type, Cairns, Queensland.
After McCarthy, 1941*D*, p. 371.

G. C. Clutton, photo. 0·4 nat. size.

Weapons.

Club (Fig. 376).—Only one example of a stone club is known, and it was described by McCarthy, 1944, *C*, p. 267, pl. xvii, fig. 7). It is a natural piece of hard stone, ground at both ends to a sharp edge, and on the edge of its axe-shaped bladed end. It resembles the *Lil Lil* type of wooden club which occurs throughout south-east Australia. This club was found at South Wambo, near Bulga, Hunter River, New South Wales. It is 56 cm. long and weighs 3 lb. 8 oz. (*see* Addenda).

Missile-stones.—Referred to as throwing-stones by all authors in the list of references.

1901. Kenyon and Stirling, table; Spencer, p. 84.
1903. Clement, p. 3.
1914. Kenyon and Mahony, p. 10.
1915. Breton, p. 25.
1921. Horne, *A*, p. 13, figs. 62-3; *B*, pp. 51-2.
1922. Spencer, p. 88.
1925. Basedow, *B*, p. 360.

These are all natural stones of a convenient shape which were picked up and thrown at game or enemies. No artificially shaped examples are recorded.

Playthings and Ornaments.

1897. Stick and stone game, Roth, sect. 216.
1901. Game stones, Kenyon and Stirling, table; playing stones, Spencer, p. 37.
1902. Stick and stone game, Roth, sect. 19.
1914. Game stones, Kenyon and Mahony, p. 10.
1915. Game stones, Breton, p. 25.
1924. Balls, Horne and Aiston, pp. 35-6, figs. 22-6.
1927. Game stones, Kenyon, p. 285.

There are two kinds of playing stones, those which are natural stones and those fashioned from clay, gypsum, or other materials. Horne and Aiston (1924, p. 36) stated that pieces of sandstone were shaped into rounded balls for use in games.

Pieces of stone were occasionally stuck in the hair as ornaments in various localities. Etheridge and Whitelegge (1907, p. 249, pl. xlii, group 1, fig. 6) described a very thin, cylindrical piece of hard stone, 7·5 cm. long, which was found at Maroubra, New South Wales coast, as a nose-style; it appears to be a natural sliver of slate, rounded by water action, and its use was conjectured by the above authors.

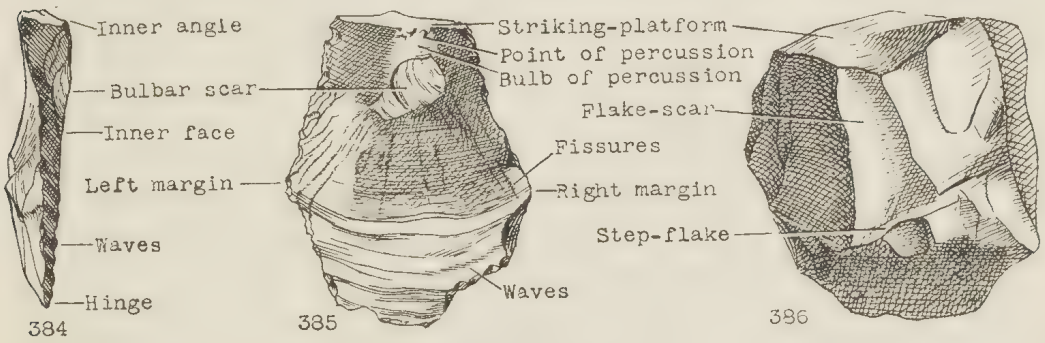
Tops.—These are rounded balls made of clay and other materials. They are spun on a board or on flat, hard ground. The game was recorded in the Lake Eyre district, Central Australia, by Horne and Aiston (1924, pp. 35–6, figs. 22–6) and, according to Roth (1897, sect. 216), has spread northwards up the Diamantina and Georgina rivers. No natural stone tops have been recorded.

Perforated Stones. (Fig. 312.)

Occasional perforated stones, apart from the *tjuringa* of Central Australia, have been reported, as for example by Ferguson (1894, p. 88), but no specialized types are known.

GLOSSARY OF SUNDRY DEFINITIONS.

This glossary includes definitions of most of the terms used in the description of implements, and indicates the manner in which they are employed in this work. Some of these definitions, which are acknowledged, are from Holmes (1919), and others were kindly supplied by Dr. C. van Riet Lowe.



Figs. 384-386. Typology.

384-5. Flake illustrating use of terms, inner face and lateral views. 386. Nucleus illustrating use of terms. G. Binsted del.

I. Material.

Cortex: A natural surface of rock; not the result of human activity (Lowe).
Lump: Any piece of unworked stone.
Nodule: A concretion in its natural state, such as an unworked lump of flint.
Pebble: A stone worn and rounded by water or other natural forces.

II. Forms.

Blade: A flake which is longer than broad, with fairly regular margins approximately parallel or ending in a point.
Block or thick flake: A heavy flake with thick, steep-faced margins.
Chip: A fragment detached from a larger mass.
Chopper: A heavy coroid or knapped piece with the working edge opposite a thick margin.
Cleaver: A large heavy flake with a broad, acute-angled cutting edge formed by the intersection of the cleavage face with another flat face (Lowe).
Core implement or coroid: An implement formed by flaking and trimming a lump, nodule or pebble.

Flake or spall: A piece knapped or broken off a lump, nodule, pebble or implement.

Nucleus or core: Remnant of a lump, nodule or pebble from which flakes have been knapped (Lowe).

Scale: A small fragment or minute flake removed in forming the edge of an implement by secondary trimming; scales may also be detached on various parts of nuclei and other implements.

Side-blow flake: The outer or initial series of flakes, bearing cortex on one surface, knapped off a pebble or nodule.

Slice: A large flake with a thick margin opposite a thin margin.

Spall (Figs. 61–65): The narrow blade, often very small, removed in forming a burin edge.

Squill: A minute scale; the scars of squills are to be seen here and there on a working edge and the squills are removed by scraping, shaving or cutting use.

III. Characteristics.

Bulbar-scar (Figs. 384–5): The scar left by the removal of a scale on the bulb of percussion of a knapped piece; commonly called the Éraillure.

Bulb of percussion (Fig. 385): The more or less rounded or conchoidal prominence on the cleavage face of a knapped piece which swells and radiates from the point of percussion (Lowe).

Chord: The thin margin joining two ends of a segment.

Cleavage or inner face (Figs. 384–5): The new face formed on a knapped piece when it is detached from the nucleus; this face frequently bears a bulb of percussion and is sometimes referred to as the bulbar face. The outer face is opposite the cleavage face.

Diffused bulb: Occurs when the force applied at the point of percussion is diffused laterally, so that a little or a very slight bulb is formed (Lowe).

Faceted striking-platform (Figs. 6, 11): The striking-platform of a nucleus which bears a series of tiny flake-scars along its edge; they are seen as a series of transverse flake-scars on the striking-platform of a flake detached from such a nucleus.

Fissure (Fig. 385): One of a series of linear scars on the cleavage face of a flake, scale or squill radiating from the point of percussion.

Hinge-fracture (Fig. 384): The smooth rounded distal end of a flake formed by the line of cleavage turning outwards and backwards before it reaches the surface of the outer face; it is an extreme form of ripple.

Inner platform angle (Fig. 384): The angle on a knapped piece formed by the plane of the striking-platform at the point of percussion, and the plane of the adjacent cleavage face to a length of about 2·5 cm.

Keeled or carinate: An implement which has a prominent ridge, usually medial, running transversely or longitudinally; a trimmed face on an implement which is divided by a ridge.

Margin or edge: The edge of a knapped piece which is on the observer's left hand when the piece is held before him with its cleavage face outwards and butt downwards is the left margin or edge; the edge of an implement which is on the observer's left hand when it is held with its lower surface outwards and its butt downwards is the left margin or edge. The right margin is opposite the left margin.

Patina: A superficial layer on a lump, nodule, pebble or implement altered by bleaching, chemical or other disintegrating action; patinated surfaces are frequently stained by iron or other agents.

Point of percussion or impact spot (Fig. 385): The point on the striking-platform of a knapped piece such as a flake where the blow that detached the piece or flake was struck (Lowe).

Ripple (Figs. 384–5): One of a series of curved, wave-like undulations on the cleavage face of a knapped piece, concentric with the bulb of percussion: also known as rings or waves (Lowe).

Salient bulb: A narrow curved edge of small radius adjoining the point of percussion on the striking-platform of a knapped piece.

Scar: *Negative flake-scar or scar-bed* (Fig. 386): The channel left on a lump, nodule, pebble or implement by the removal of a flake, scale or squill.

Spur: The pointed projection at the end of a ridge between two flake-scars.

Starch-fracture: A natural scar-bed sometimes found on flint; distinguished from man-made flake-scars by the absence of a negative bulb of percussion and by the presence of dull, shaly surfaces.

Step-flake (Fig. 386): A narrow ledge-like projection found on some implements, such as nuclei and burins, where the run of a flake or spall has terminated.

Striking-platform (Figs. 385-86): The more or less flat area which receives percussion or pressure when removing a flake or fragment from the parent piece; in the case of a nucleus, this platform may be prepared by removing one or more flakes at a suitable working angle, and further, by the removal of a series of scales inwards from the working-face.

Thermal-fracture: A natural fracture, usually in the form of a pit or depression on the surface of a stone, caused by expansion and contraction brought about by changes in temperature; the fragments detached in this manner are thickest at the centre and bear concentric ripples.

IV. Shaping Processes or Techniques.

It is as yet impossible to define the full range of fracturing and shaping processes that were employed in Australia, where very little attention has been given to this aspect of typology. For this reason only those processes referred to in the text of this work are defined. Readers are referred to Holmes (1919, pp. 278–367, figs. 142–223), in which is given an excellent description, with good illustrations, of the processes employed by the North American Indians.

Bipolar technique: The production of small, regular flakes bearing a point of percussion at each end due to the method of knapping.

Blocking: The shaping of the outer face of a knapped implement on the nucleus before it is detached.

Grinding, whetting: Simple manual abrasion, the stone abraded being held in the hand and rubbed on another stone, or abraded by another stone held in the hand (Holmes, 1919). Also applied to the process of treating seeds with millstone and muller in Australia.

Pecking or hammer-dressing: The production of small pits or indentations on the surface of an artefact by striking it with a stone or other tool; also known as crumbling and pitting.

Percussion-flaking or knapping: Fracture by striking the stone to be worked with or against another stone, or by use of a punch, thus purposely shaping the stone being worked or obtaining desired flakes or fragments (Holmes, 1919). It is convergent when the flake-scars converge on one point, otherwise it may be parallel or irregular.

Polishing: Abrasion with a soft or hard surface variously applied to give finish and polish (Holmes, 1919).

Pressure-flaking: Fracturing and shaping a stone by pressing off flakes, scales or squills with a bone or wooden tool.

Primary working: Comprises (*a*) all preparation of a nucleus before detachment of desired flakes, and (*b*) the shaping of an implement by percussion or pressure.

Quartering: The fracturing of a large lump, nodule or pebble into portions suitable for conversion into implements.

Sawing: Simple manual abrasion with a plain or notched edged implement (Holmes, 1919).

Secondary working or chipping: All work done on a knapped piece detached from a nucleus; also called re-edging or re-touching when applied to a used working edge.

V. Working Edges.

Abrupt-trimmed (Fig. 88): Secondary trimming which produces a steep-faced or vertical working edge.

Battered or pounded: An edge or surface damaged by a series of blows; it has a bruised, crushed appearance.

Concave (Figs. 40–48): An incurved working edge.

Dentated (Fig. 179): A working edge with points (or teeth) separated by notches at relatively wide intervals (Lowe).

Nosed (Figs. 49–56): A trimmed projection of triangular, rectangular or rounded form.

Notched (Fig. 100): A working edge which bears a series of U or V shaped trimmed indentations.

Overthrust: An edge worn by use and trimming until it underlies the side and body of an implement.

Resolved or step-trimming: Secondary trimming of a working edge which produces a series of step-like levels, usually on a steep-faced or overthrust margin.

Scaled or nibbled: An edge trimmed by the removal of minute scales.

Serrated (Figs. 181–83): A saw-like, or toothed, working edge produced by secondary trimming.

VI. General.

Artefacts: All objects made or fashioned by man.

Culture: A group of industries and peoples of the same general age at various sites which reveal close relationship in tool types and techniques (Lowe).

Implements: A generic term for the tools, weapons, etc., made by man.

Industry: Artefacts of the same people and age at any one site (Lowe). Several industries of successive periods may be found at any one site.

Kitchen-midden: Artificial deposit or refuse heap of shells and bones and occasional artefacts.

Midden: The accumulated débris of man's occupation and living, including artefacts, implements, hearths, remains of food, etc. (Lowe).

Occupation or home-site: Any place showing signs of comparatively prolonged occupation by man (Lowe).

Station or site: Place at which implements are found, such as a temporary camp-site, not necessarily a home- or factory-site (Lowe).

Workshop or factory-site: A site, not necessarily being an occupation or home-site, where artefacts are made, such as a quarry (Lowe).

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MEMOIR IX—INDEX.

PAGE.

Abrading stones 3, 57, 61-66
Abrupt-trimming 6, 24, 82, 90
Acicular scraper 36
Adelaide adze-flake 29-30
Adelaide point 34, 38
Adze-flakes 6, 28-30, 36, 42
Adze-heads 53-54, 57, 59, 64
Adze-like axes 53-54
Aerolites 74
Alien edge-ground implements 57
Alternate knapping 12
Anvil stones 44, 59, 60-61, 66
Arapia block 3, 20-21
Artefacts 82
Asymmetrical flake 24
Asymmetrical points 34-36
Aurignacian caréné 15, 17
Axe-heads, Edge-ground .. 45-53, 57, 59, 64
Axe-sharpening stone 62, 63-64

Ball 79
Ballarat implement 76
Basket-weight 75
Battered edge 34, 44, 82
Bibliography 5-6, 82-89
Bicycle-saddle implement 77
Biface adze-head 53
Biface axe-heads 47-49, 54
Biface chisel 55
Biface discoids 12
Biface points 34, 38-39
Biface scraper-knife 55
Biface tanged implements 77
Biface trimmed implements 15
Bi-marginal point 38
Bipolar technique 81
Blade 79
Blade axe, Uniface 47, 49
Blanks 3, 6, 15
Blocking 81
Blocks 17-21, 79
Blood-letting knives 27
Bogan pick 3, 76, 90
Bondi culture 6
Bondi-point 34-36, 38
Bone-polishing stone 64
Borer 31-32
Boucher 15
Brachina percussion stone 57, 59
Braying stones 57
Bronze age influences 6
Buandik biface 15
Bulbar-scar 79, 80
Bulb of percussion 79, 80
Bulga scraper-knife 55-56
Burins 17, 21, 33
Burnisher 64
Burren adze-flake 30
Button flake 34

PAGE.

Carinate block 21, 80
Carrot-shaped stone 66-67
Celts, flaked 17
Characteristics 4, 80
Children's axe 54
Chip 79
Chipped-back knife 4, 22, 27, 34, 40
Chipping 5, 57, 81
Chisel, Edge-ground 54-55, 64
Chisel, Trimmed 28, 34
Choppee 12, 57
Choppers 12-15, 17, 20, 56, 79
Chord 80
Cicatrization knife 24, 27
Circumcision knife 27
Churinga 3, 66-70
Classification 1-3, 8-9, 17, 44, 58
Cleavage face 80
Cleaver 15, 21-22, 79
Club 78, 90
Compound striking-platform 12
Concave (dished) platform 10
Concave edge 82
Convergent knapping 12
Coral pencil 65
Core implements, Trimmed 3, 9-17, 79
Core-scrapers 12, 13, 15, 17, 18
Cores 9-12, 60, 80
Cornute stone 66-68
Coroid adze-heads, Biface 53
Coroid axe-heads, Biface 47-49, 54
Coroid edge-ground axe-heads 44
Coroid implement, Pebble 12, 15
Coroid implements, Trimmed .. 3, 9-17, 79
Coroid percussion stones, Trimmed .. 59
Coroid picks, Trimmed 60, 90
Cortex 79
Coup-de-poing 15
Crescent 40
Crystals, Magical 74
Cultures 4, 6, 82
Cylindro-conical stones 44, 66-68, 76

Death-pointer 90
Death-spear barbs 44
Death stones 67
Dentated edge 21, 27, 38-39, 82
Detaching stones 34, 57, 59
Devon Down's cultures 6, 30
Diffused bulb 80
Dipoonga 65
Discoid lenticular axe-head 47-50
Distributions 4-5
Domestic implements 75-78
Dressed axes 51
Drill 32-33
Dripping-gum technique 5
Duckbill scraper 24
Duelling knife 27

PAGE.
Edge 80
Edge-ground implements .....
3, 6, 15, 44-57, 62, 64, 67, 76-78
Elouera scraper-knife .. 3, 4, 6, 22, 27-28, 29
Emu's eyes 74
Engraved stones.. 56-57, 62, 67, 70-74, 77-78
Eoliths 4, 6
Epi-palaeolithic 6
Excavation 7

Fabricators 34, 57, 59
Faceted striking-platform.. 6, 10, 17, 36, 80
Factory site 82
Fighting knife 30-31
Finger-grips 57, 59, 60
Fire-making stones 75-76
Fish-hook file 65
Fishing stones 57, 76
Fissure 79, 80
Flake 80
Flake-scar 79, 81
Flint biface coroids 15, 90
Flint blade 31
Forms 79
Fulham culture 6
Fulham-type *pirri* point 38
Function 3
Future research 6

Game stone 78-79
Gizzard stone 74
Glass implements 7
Gouge 9, 28
Grattoir 13, 15
Graver 29, 36, 42
Grinding ... 3, 6, 44, 53, 61-67, 70, 76-78, 81
Grinding stones 3, 61-66
Grooved adze-head 53, 76
Grooved axe-heads 50-53
Grooved conical stone 53, 76
Grooved hammerstone 57-59
Grooved percussion stones 57, 59
Grooved pick 76
Ground-edge implements .....
3, 6, 15, 44-57, 62, 64, 67, 76-78

Hafting methods 65
Hammer-axe 15
Hammer-dressing, see Pecking.
Hammerstone 44, 58-59, 76
Hand-axe 13, 15, 17, 56
Hatchet, Edge-ground 45-53, 57, 59, 64
Hatchet, flaked 15
High-backed implement 28
High-crowned core 10
Hinge-fracture 79, 80
Hoabinhien culture 4, 6
Hog-back transverse section 53
Home-site 82
Hone 63-64
Horn record stone 67
Horsehoof nucleus 10-12, 21
Hunting implements 75-78
Husking stone 58-60

Ideal types 3
Illawarra chipped-back knife 27
Impact spot 80
Implements 82

PAGE.
Improvised pebble axe 13, 47
Incised stones .. 56-57, 62, 67, 70-74, 76-78
Indiscriminate striking-platform 12
Industries 6, 82
Inner face 79, 80
Inner platform-angle 79, 80
Iron implements 7

Kalara scrapers 28-29
Kangaroo Island culture 6
Karta 13, 18-19
Kartan culture 4, 6
Keeled 80
Kern 61-62
Kimberley biface point 6, 38
Kimberley biface serrated point 6, 39
Kimberley *pirri* point 4, 6, 36-38
Kitchen-midden 82
Knapped edge-ground axes 44, 47
Knapped implements 17-44
Knapping 5, 12, 57, 81
Knife, Edge-ground 54-57, 64
Knife, Trimmed.. 12, 21, 22, 24-27, 30-31, 40
Kodja 15-17
Kulki percussion stone 3, 59, 66

Lancet 24, 34
Leaf-shaped point 36-39
Legendary stone 74
Leilira-blade 30-31
Lenticular transverse-section .....
47-49, 50, 52, 53, 77
Levallois flake 25
Local variation, Areas of 6
Lump 79

Magic stone 67, 68, 74, 76
Margin or edge 79, 80
Material 5, 79
Material and technique 5, 24
Meat-cutter 43-44
Mena tanged implement 3, 44, 76-78
Men's knife 31
Merna wadna adze-flake 27, 29
Mesolithic period 4, 6
Micro-burin 43
Microliths 4, 6, 12, 17, 30, 34, 40-44
Midden 82
Mika knife 30-31
Millstone 61-62
Miniature axe 54
Missile-stone 78
Morah millstone 3, 62
Mortar 53, 65-66, 67, 76
Mount Gambier industry 6, 15, 90
Muckera stone 74
Muduk 64
Mudukian culture 6, 30
Muller 59, 61-62, 66
Muraian 71
Murundian culture 6, 30
Museum collections 7

Nardoo stones 59, 62, 66
Necked axe 51
Negative flake-scar 81
Neolithic period 4, 6
Nibbled edge 82
Nodule 79

PAGE.
Nomenclature 3-4
Normal flakes and blades 17, 22-40
Nose 82
Nose-style 79
Notched edge 82
Nuclei 9-12, 60, 80
Nucleiform Burin 17, 21

Occupation-site 82
Ornaments 79
Oval transverse-section 49, 53, 76, 77
Overthrust edge 82
Oyster-pick 59-60

Painted stone 71, 74
Palaeolithic period 4, 6
Paroo point 34, 38
Patina 80
Pebble 79
Pebble axe-heads 13, 46-47
Pebble bone-polishing stone 64
Pebble chisel 54-55
Pebble chopper 13
Pebble implement, Core 12, 15
Pebble implement, Split- 13, 15, 19, 21, 47, 56
Pebble implement, Uniface ... 4, 13-15, 60
Pebble millstone 62
Pebble mortar 66
Pebble muller 62
Pebble percussion stone 59
Pebble scraper-knife 54-55
Pebble smoothing stone 64
Pebble whetstone 63-64
Pecked adze-head 53
Pecked and grooved adze-head 53
Pecked and grooved axe-head 50-53
Pecked axe-head 50
Pecked chisel 55
Pecked cylindro-conical stone 67
Pecked millstone 62
Pecked mortar 66
Pecked muller 62
Pecked percussion stone 59
Pecked pick 76
Pecked scraper-knife 55
Pecked tanged implements 77
Pecked whetstone 63
Pecking 3, 6, 44, 50-55, 57, 59, 61-64, 66-67, 69, 70, 76-78, 81
Percussion flaking 81
Percussion implements 3, 12, 44, 57-60, 65-66
Percussion-muller 66
Percussion stones 57-59, 65-66
Percussion techniques 5
Percuteur 12, 58
Perforated stones 79
Pestle 58, 65-66
Phacoid stone 66-68
Phallic stone 66, 71-74
Pick 30-31, 60, 76, 90
Piercer 31
Pigmy implements 40
Pike 53
Pirri point 4, 6, 30, 34, 36-39
Pirrian culture 6, 30, 38
Pitted axes 50

PAGE.
Plane, Trimmed 17
Playing stone 79
Point of percussion 79, 80
Points 4-6, 12, 31, 34-40
Polished adze-head 44, 53, 76
Polished and grooved axe-head 53, 76
Polished axe-head 44, 53
Polished chisel 55
Polished cylindro-conical stone 67
Polished pick 76
Polished scraper-knife 55
Polished tanged implement 77
Polishing 3, 6, 44, 53, 64, 67, 76-78, 81
Polyhedral implements 58, 62
Pot-lid flake 28
Pounded edge 82
Pounding stones 57-60, 65-66
Pressure-trimming 5, 38, 81
Primary working 81
Priority, Principle of 4
Proto-Neolithic 6
Punch 10, 12, 34
Puralka flint 22
Pur-rut-thri axe-head 53

Quartering 81
Quartz-chips 43-44
Quartzite knife 30-31
Quartzite pick-axe 30-31
Quartzite spear-head 30-31

Raclette 24
Racloir en coche 22
Radial knapping 12
Rain-making stone 74
Rasp 64, 65
Rectangular transverse-section.. 50, 52, 57
Reject material 7, 15
Relationships 5-6
Reniform scraper-knife 56
Resolved trimming 82
Re-touch 81
Riambi oyster-pick 60
Ripple 80
Ritual implements 3, 66-75
Rock engraving stone 66
Rostro-carinate 15
Rounded transverse-section 47-50, 52, 53, 76

Salient bulb 81
Saw 24, 27, 44
Sawing 81
Saw-knife 43-44
Scale 80
Scaled edge 82
Scarifier 34
Scraper-knife 27, 55-56, 64
Scrapers 6, 22-27
Secondary working 81
Semi-biface coroid implement 15
Semi-biface pebble axe 47
Semi-uniface implement 13, 47
Serrated edge 21, 27, 38-39, 82
Serrated point 38-39
Shaping processes 3, 5, 81
Shell pick 59
Shouldered axe 50
Side-blow flake 80

PAGE.
Simple striking-platform 10
Sinker 76
Site 82
Skin-dresser 54, 56-57
Slate scraper 56-57
Slate spear-head 38
Slice 17, 21-22, 80
Slug 28-30
Smoothed edge 34, 76
Smoothing stone 64
South Australian *pirri* 37
South-western axe 17
Spall 33, 80
Spear-barbs 34, 64
Spear point 30-31, 34, 38
Specialized types 3, 8-9
Split-pebble implement .....
13, 15, 19, 21, 47, 56
Spokeshave 22
Spur 81
Squill 80
Starch-fracture 81
Station 82
Step-flake 79, 81
Step-trimming 82
Stigmate burin 43
Striking-platform 10-12, 17, 79, 81
Sub-cylindrical stone implement 53
Subincision knife 27
Sumatra-type 3, 4, 13-14, 47
Surgical knife 27, 34
Sydney point 34
Symmetrical flake 24
Symmetrical points 34, 36-40
Systematic collecting 7

Taap saw-knife 43-44
Tableland implements 4
Tanged implements 44, 50, 76-78
Tartangan culture 6, 30
Tasmanoids 6, 17
Tea-Cosy core 10
Technique and material 5, 24
Techniques 3, 5, 6, 81
Teyl 74
Thermal fracture 81
Throwing stone 78
Thumbnail scraper 40, 42
Tjuringa 3, 66-70
Tomahawk, Edge-ground .. 45-53, 57, 59, 64

PAGE.
Tomahawk, flaked 15
Top 79
Tortoise-core ..... 12, footnote
Toy tomahawk 54
Transition-type axe 46-47
Transverse-sections 3, 44, 45
Trapezoid transverse-section 31
Triangular transverse-section 22, 31
Tribal debt stone 66
Trigonal knife 30-31
Trimmed coroid percussion stone ... 59
Trimmed cylindro-conical stone 67
Trimmed lump 59-66
Trimmed millstone 62
Trimmed mortar 66
Trimmed muller 62
Trimmed tanged implements 77
Trimmed *tjuringa* 70
Trimmed whetstone 63-64
Trimming-stone 34, 59
Tula adze-flake 3, 6, 20, 28-29
Typology 1-4, 79

Uniface blade axe-head 47, 49
Uniface coroids 13-15
Uniface pebble axe 46-47
Uniface pebble implement 4, 13-15, 60
Untrimmed point 37, 40
Upper Coliban core 10
Use-polished edge 34, 76
Utilized implements 28
Utilized nuclei 12
Utilized pebbles 59-66

Vaginal knife 27

Waisted axe 51
Wanalta axe-head 52-53
Wa:nji biface point 39
Waves 79
Wedge 21-22, 44, 45, 48, 50-53
Weight 75
Whetstone 63-64, 81
Windang axe 46-47
Woakwine point 6, 34, 36
Women's knife 31
Worimi cleaver 3, 21-22
Working edges 82
Workshop-site 82

Yodda tanged implement 3, 44, 76-78